A QUASI EXPERIMENTAL STUDY TO ASSESS THE EFFECTIVENESS OF BACK MASSAGE IN REDUCING POST OPERATIVE PAIN AND IMPROVING QUALITY OF RECOVERY AMONG PATIENTS UNDERGONE ORTHOPAEDIC SURGERY AT SELECTED HOSPITALS IN DINDIGUL DISTRICT.

A DISSERTATION SUBMITTED TO THE TAMILNADU DR.M.G.R MEDICAL

UNIVERSITY, CHENNAI, IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN NURSING.

OCTOBER-2015

A QUASI EXPERIMENTAL STUDY TO ASSESS THE EFFECTIVENESS OF BACK MASSAGE IN REDUCING POST OPERATIVE PAIN AND IMPROVING QUALITY OF RECOVERY AMONG PATIENTS UNDERGONE ORTHOPAEDIC SURGERY AT SELECTED HOSPITALS IN DINDIGUL DISTRICT.

Ms. VINOJPRIYA .C

A DISSERTATION SUBMITTED TO THE TAMILNADU DR.M.G.R MEDICAL UNIVERSITY, CHENNAI, IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN NURSING.

OCTOBER-2015

CERTIFICATE

This is a bonafide work of **Ms.VINOJPRIYA.CM.Sc (N)** II Year Student from Sakthi college of Nursing, Dindigul, Tamilnadu, India, submitted in partial fulfillment for the Degree of Master of Science in Nursing under the Tamil Nadu Dr.M.G.R Medical University, Chennai.

Signature of the Principal _____

Prof. V.JANAHI DEVI M.Sc (N).,

College Seal _____

A QUASI EXPERIMENTAL STUDY TO ASSESS THE EFFECTIVENESS OF BACK MASSAGE IN REDUCING POST OPERATIVE PAIN AND IMPROVING QUALITY OF RECOVERY AMONG PATIENTS UNDERGONE ORTHOPAEDIC SURGERY AT SELECTED HOSPITALS IN DINDIGUL DISTRICT.

The Research Study Approved By Dissertation Committee On……

1. RESEARCH GUIDE:

Prof.V.Janahi Devi, M.Sc (N).,
Principal,
Sakthi College Of Nursing,
Oddanchatram,
Dindigul. (DT)

2. CLINICAL GUIDE:

Asst. Prof. Shobana,M.Sc (N).,
Department of Medical Surgical Nursing,
Sakthi College Of Nursing,
Oddanchatram,
Dindigul(DT).

3. MEDICAL EXPERT:

Dr.Muralidharan, M.S.,(ortho),D.,(ortho)

Consultant Ortho Surgeon,

City hospital, Dindigul (DT).

CERTIFIED BONAFIDE WORK DONE BY

Ms. VINOJPRIYA .C

SAKTHI COLLEGE OF NURSING,

ODDANCHATRAM,

DINDIGUL.

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTERS OF NURSING FROM THE TAMILNADU DR.MGR UNIVERSITY, CHENNAI.

EXAMINERS:

1.

2. _____

ACKNOWLEDGEMENT

”Thanks be to God for his all blessings and miracles”

My great indebted thanks to the **Lord Almighty** for his abundant blessings, endless grace and love showered on me in providing the strength to overcome all the difficulties and made me to complete my study successfully, without which it would not have been possible.

There are several hands behind in giving a shape to this research study, which would be impossible to mention all by name. There are some whom the investigator would particularly like to thank.

I am substantially thankful to our chairman **Dr.K.Vembanan M.B.B.S., M.S and** express my deep gratitude and heartful thanks to our vice-chairman **Dr. GokilaVembanan M.B.B.S, DGO** for their encouragement and dedication towards the academic excellence and for providing me an opportunity to finish my project successfully.

It is my bounden duty to express my heartiest gratitude to **Prof.V.Janahidevi M.Sc (N),** Principal, Sakthi College of Nursing, for her constant enthusiastic support, warmth inspiration and gave innovative ideas to incorporate in this study.

I express my deep heartfelt thanks to my clinical guide **Asst.Prof.Shobana M.Sc (N).,** Department of Medical – Surgical Nursing, Sakthi College of Nursing, for diligent effort the best quality, peaceful, her reassuring plan and a very approachable and inspiring quote, that can never be forgotten.

I extend my gratitude and affectionate thanks to **Asso.Prof.Shoba.E.Merina M.Sc (N).,** Head of the Department of Medical Surgical Nursing for her constant encouragement, supervision and timely help during the entire course of study.

I express my deep heartful thanks to **Asso.Prof.Sumathi., M.Sc (N).,** our class co-ordinator, Head of the Department of Mental Health Nursing, Sakthi College of Nursing, for her valuable guidance, support and encouragement which enabled me to complete this study successfully.

I extend my whole hearted thanks to all **Faculty Members** of Sakthi College of Nursing for their continuous encouragement, guidance and valuable suggestions for this study.

I profusely thank all **Medical and Nursing Experts** who validated the content and tool, which helped to incorporate their views in this study.

I am thankful to **MS.Bhuvana Msc.,** computer technician and **Mrs.Poongodi M.Sc**, librarian of Sakthi College of Nursing for helping me with literature work and for extending library facilities throughout the study.

I wish to communicate my extraordinary credit to **Mr.Manikandan**, Biostatistician for his well-timed and opportune aid and backing in statistical analysis and presentation of data.

I extend my special thanks to **Dr.Muralidharan, M.S (ortho)., D. (ortho).**, Consultant ortho surgeon, City Hospital and **Dr.D.Joseph Christopher Babu M.S (ortho).**, Consultant ortho surgeon, JCB Hospital, Dindigul district who gave me permission to conduct the study and my special heartful thanks to **all the participants**

for their co-operation throughout the study.Without their co-operation it would not have been possible to complete my study.

My grateful thanks to **Mrs. S.Dhanalakshmi M.A., M.ED .,M. Phil., PhD .,** HOD of Tamil and **Mrs.D.Maheswari M.A.,M.ED.,M.Phil.,** Asst.professor of English, Sakthi Arts and Science for editing this manuscript and tool in Tamil and English.

A special note of gratitude to my classmates **Mrs.Suvarchala Medaramitla, Mrs. Luman Sathya** and **my lovable seniors** and **juniors** for their co-operation and help they rendered throughout the study.

It is my honour and previledge to thank my parents **Mr.Chinnasamy** and **Mrs.Valarmathi** and my sister **Ms.Anusuya,** brother **Mr.Karthikprabu** and my friends **Ms.Sumina, Ms.Blessy Charles, Mr.Siva Selvan, Ms.Sheela Mary, Mr.Sam Pushbharaj, Mrs.Saranya** and **Ms.Ramya Shandhini** for their constant and continuous support, timely help, prayer and encouragement to complete this study as a very successive one.

This study drew upon the knowledge and help, experience and expertise of many persons of good will, though too numerous to name, each one of them is remembered for their individual contributions without which the realization and presentation of this research would not have been possible. So I shower my great deal of thanks to those who helped directly and indirectly in this study.

TABLE OF CONTENT

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

CHAPTER -I

INTRODUCTION

Pain is deeper than all thought; laughter is higher than all pain

The skeletal system serves as a framework for tissues and organs to attach themselves to. This system acts as a protective structure for vital organs. Bones and other skeletal materials must be resistant to such stresses, or they may break or distort. The types of forces experienced on different parts of the body will influence the structural material.

Musculoskeletal disorders (MSDs) are injuries or pain in the body's joints, ligaments, muscles, nerves, tendons, and structures that support limbs, neck and back. MSDs are degenerative diseases and inflammatory conditions that cause pain and impair normal activities. They can affect many different parts of the body including upper and lower back, neck, shoulders and extremities (arms, legs, feet, and hands)

In general population, musculoskeletal disorders are an increasing health care issue globally, being the second leading cause of disability. In the U.S. there were more than 16 million strains and sprains treated in 2004, and the total cost for treating musculoskeletal disorders is estimated to be more than $125 billion per year. In 2006 approximately 14.3% of the Canadian population was living with a disability, with nearly half due to, musculoskeletal disorders.

Orthopaedic surgery addresses and attempts to correct problems that arise in the skeleton and its attachments, the ligaments and tendons. It may also include some problems of the nervous system, such as those that arise from injury of the spine. These problems can occur at birth, through injury, or as the result of aging. They may be acute, as in an accident or injury, or chronic, as in many problems related to aging.

Between 2001 and 2011, the prevalence of musculoskeletal procedures drastically increased in the U.S, from 17.9% to 24.2% of all operating room procedures performed during hospital stays.

In a study of hospitalizations in the United States in 2012, spine and joint procedures were common among all age groups except infants. Spinal fusion was one of the most common procedures performed in every age group except infants younger than 1 year and adults 85 years and older. Laminectomy was common among adults aged 18-84 years. Knee arthroplasty and hip replacement were in the top procedures for adults aged 45 years and older.

Jakoi A et al., (2011) stated about orthopaedic consultation in India. A total of 71.5%of patients required orthopedic consultation. Average age was 35 years, with men injured at a ratio of 8:1. The most common mechanism of injury was motorcycle versus automobile (n = 48). A total of 206 fractures in 108 patients were discovered. The most common site of fracture involved the lower extremities. Open reduction with internal fixation was performed on 110 fractures (69 patients) during primary admission. Fifty-seven patients (57%) sustained open fractures requiring emergent orthopedic intervention. Fifty-three patients (53%) had various concomitant complications. Two patients died during initial hospitalization. Average hospitalization for patients without orthopedic consultation was 11.9 days versus 13.8 days with orthopaedic consultation. The average number of orthopedic procedures performed on patients was 1:6.

Orthopaedic procedures have been reported to have the highest incidence of pain compared to other types of operations.

Orthopaedic surgical Pain is defined by the World Health Organization as “an unpleasant sensory or emotional experience associated with actual or potential tissue damage, or described in terms of such damage.” After orthopaedic surgeries such as knee replacements, hip replacements, and repair of hip fractures, pain management is essential during rehabilitation to maximize recovery and ensure the best possible outcomes.

Pain following orthopedic surgery affects the functional ability and outcomes. Inadequate postoperative pain management decreases participation in rehabilitation and activities of daily living and increased potential for chronic pain. Pain management is essential optimal for patient outcome both from perspective of the health care provider and patient.

Lewis.SL (2007) Postoperative pain is caused by the interaction of number of physiologic and psychologic factors. The skin and underlying tissues have been traumatized by the incision and retraction during the surgery. Postoperative orthopaedic pain can complicate and delay patient’s recovery, lengthen hospital stays and costs, and interfere with a patient’s return to activities of daily living. In many people, pain medications can have unpleasant side effects.

Alternative therapies are commonly used treatment modalities in present days as it does not have side effects and also it is effective. These therapies are used together with conventional medicines, for the purpose of increasing comfort or relaxation, improving or restoring health and harmony of the body, mind and spirit, improving coping mechanism, reducing stress, relieving pain and increasing the patient’s sense of wellbeing.

Massage therapy is the scientific manipulation of the skin and soft tissues of the body. Massage therapy has cellular effects by mechanotransduction,

biomechanical effects on tissues, physiological changes in tissues or organ, neurological effects by reflex stimulation, psychological effects by increasing relationship between body and mind.

Touch could induce pain relief by activating the large beta afferent nerve fibers from receptors in the skin as they connect with the cells in dorsal horn of the spinal cord. Stimulation of these fibers by stroking skin has been found to affect the activity of these nociceptive cells in the dorsal horn close the gate on the barrage of pain stimuli reaching the brain.

Stimulation of reflex point in the back is a relaxing treatment which is the concept of massage therapy. The stimulation of reflex points on the back stimulate release of endorphins from the brain which is the body's natural pain killer and it promotes a healing response in every organ, glands and body system and also promotes relaxation, reduces discomfort, improves recovery.

Stephanie and Rothman stated that hypnosis, massage, reflexology and chiropractic manipulations have also proven beneficial for pain relief. This serves to balance the body's subtle energies, which, in turn, bring both emotional relaxation and pain relief to the body.

Diana L. Thompson (2012) conducted somatic research study on Back massage Improves Postoperative Experience showed that there was a 50% reduced use of analgesics in the experimental group where back massage used for pain control, against the control group were only analgesics administered. The study concluded that back massage was effective in reducing post operative pain among orthopedic surgery.

NEED FOR THE STUDY

"There is no part of my life, upon which I can look back without pain"

-Florence nightingale

A variety of professional and allied health care providers are concerned with the health care needs of society. The physician's focus is the treatment and repair of abnormality e.g. fracture. A physical therapist may provide treatment to restore mobility. However the domains and scope of nursing practice are in a dynamic state.

Nursing practice today is composed of a wide variety of roles and responsibilities necessary to meet the health care needs of society. Nurses are the frontline professionals of health care. Nurses offer skill to those recovering from illness or injury and advocate for patient's right and educate patients, so that they can make informed decisions and support patients at critical times. Comfort is a concept, central to the art of Nursing. The concept of comfort is as subjective as that of pain.

-Patricia (2007)

The International Association for the study of pain (2011) defines pain as '' an unpleasant sensory and emotional experience associated with actual or potential tissue damage''. There are variations in each patient's experience with pain and the ability to cope or deal with the ''unpleasant sensory'' perception that the pain entails.

Pain is subjective, eliciting different responses; however there is no set gold standard of care for treating pain in patients.

M. Kurtz, PhD et al., (2012) conducted a survey on Total hip arthroplasty demand rising on a global level. The researchers found an estimated 959,000 annual primary and revision total hip procedures. The average rate of THA was 131 procedures per 100,000 population, and the average revision burden was found to be 12.9%. According to the findings, 57.7% of the patients were women and 32.9% of patients were under the age of 65 years.

A survey carried out by the **ISBMR** among orthopedic surgeons across the country, revealed that in government hospitals about 80-85% hip fractures are surgically treated whereas in private hospitals almost 100% receive surgical treatment.

D. K. Dhanwaletal., (2009) conducted a survey on incidence of hip fracture in Rohtak district, North India. A total of 541 patients with hip fracture were hospitalized in Rohtak district in year 2009. Out of these, 304 were from Rohtak district. Hip fracture crude incidence above the age of 50 years was 129 per 100,000. They were 105 and 159 per 100,000 among men and women, respectively. Hip fracture incidence was similar in both sexes till age of 55 years. From age of 55 onwards, the rates were significantly higher in women**.**

J Orthop Sci. 2010 indicated an overview of clinical features of orthopedic surgery in India. The highest rate of surgery of the spine (5.8%), knee joint (4.5%), or hip joint (1.8%) occurred in patients in their seventies, and the highest rate of surgery for trauma (9.1%) occurred in patients in their eighties. Hip fracture surgeries resulted in relatively high in-hospital mortality (1.38%) and postoperative complication rate (3.6%).

Sheela Philomena (2012) Stated on Knee Replacement Surgery Incidence Rises in India. Findings indicated a 130-fold increase in incidence of total knee arthroplasty among those between the ages of 30 and 59 years during the study period. The incidence increased from 0.5 to 65 operations per 100,000 individuals, with the most rapid increase occurring from 2001 to 2006 (18 to 65 operations per 100,000). Increase in incidence of partial knee replacements was also observed from 0.2 to 10 operations per 100,000 inhabitants. Researchers also found that in the last ten years of the study the incidence of total knee replacements was 1.6 to 2.4-fold higher in women than in men. Incidences of total and partial knee replacements were also higher in the oldest age group (50 to 59 years of age).

A study was conducted on minimally invasive surgical techniques and day care anesthesia. Advances in anesthetic and surgical techniques along with escalating healthcare costs have resulted in an ever increasing number of surgical procedures, being performed on a daycare basis in India as well as worldwide. Most common reasons of unanticipated delay in hospital discharge are excessive fatigue, nausea, and vomiting and unrelieved pain. One such prospective study of 10,008 ambulatory surgical patients found a 5.3% incidence of severe pain in the Post Anesthetic Care Unit after ambulatory surgery. Patients following orthopedic surgery, had the higher incidence of pain (16%), followed by urologic (13.4%) and general surgical procedures (11.5%).

Funda EsenBüyükyilmaz MSc, RN et al., (2010) conducted a study on Postoperative Pain Characteristics in Turkish Orthopaedic Patients. The study sample consisted of 150 patients who met the inclusion criteria and agreed to participate in the study. Data were collected using a questionnaire form that included socio-

demographic, postoperative pain characteristics, and the McGill Pain Questionnaire. Results showed that, in the assessment of pain severity on the third postoperative day, the Present Pain Intensity was determined to be a mean of 1.75 ± 1.02 (on a scale of 0 to 5), and 78.7% had "intermittent" pain. In addition, worst/severe pain severity was determined to be a mean of 4.55 ± 0.70 on the third postoperative day. Statistically significant differences were found between patients' pain severity scores ($p \leq$ 0.001).They concluded that, nurses must learn the postoperative pain characteristics of orthopedic patients to implement safe and effective postoperative pain management.

Over the years, mankind had devised many methods to combat pain. Pain methods can be divided into two main groups; pharmacological and non-pharmacological ones. Postoperative pain is routinely poor controlled by pharmacological means alone. Complimentary strategies based on sound research findings are needed to aid in postoperative pain relief as patients routinely report mild to moderate pain even though pain medications have been administered. One of the most significant limitations associated with pharmacological pain relief is that almost every drug used as analgesics has got a deleterious effects over patients. Analgesics have a maximum effective dose, increasing the dose cannot decrease pain relief, but may increase side effects.

A clinic endoscopic histo pathological study was conducted in Kings George Medical College on effect of community used non- steroidal anti- inflammatory drugs on gastric mucosa. It was found that all these drugs were known to produce gastro intestinal lesions. Here they found aspirin and phenylbutazone caused gastric mucosal damages on 33.3%, 37.5% and 15% of the population respectively and also

ineffectiveness of using analgesia alone, to relieve pain has focused today's nursing system on complimentary treatments and non- pharmacological interventions.

Complementary and alternative therapies are the fastest growing areas of health care. The main difference between conventional medicine and complementary medicine is the inclusion of the emotional, spiritual, and physical components of wellbeing; complimentary methods utilize the client's own energy to enhance the healing potential. The inclusion of complimentary therapies in orthopaedic care vastly increases the choices available to patients throughout surgery, postoperative care and orthopaedic rehabilitation.

There are some complimentary therapies to reduce post operative orthopaedic pain without causing any adverse effects. Few scientific studies have been done in this area; many patients have reported benefits from acupressure, acupuncture, various herbal remedies and yoga, massage, reflexology. Among these complimentary therapies massage has found to be effective and commonest method used to relieve pain, improves recovery and promotes relaxation.

Massage is a simple way of easing pain, while at the same time aiding relaxation, promoting a feeling of well-being and a sense of receiving good care. Scientifically, massage may be defined as group of systematic and scientific manipulations of body tissues best performed with the hands to decrease inflammation, anxiety, noci-ceptive input and stiffness of skeletal muscle and helps to increase collagen reorientation and improves wound healing, blood circulation.

Eghbali M et al., (2010) conducted a study on effect of back massage therapy on pain severity in orthopaedic patients. 60 arthroscopic knee surgery patients were

included in this study. They were randomly divided into two groups of experimental and control. The experimental group received back massage for 20 minutes with routine care in two sessions, with 24 hours interval. The researcher analyzed the end results by using visual analog scale. Findings of the study concluded that there are meaningful difference between mean score of pain severity before and after massage in intervention group at $p<0.001$. The researcher concluded that back massage is a safe and effective intervention. It could be used as an easy, cheap and excutable method for treating pain even at patient's home.

Liza Dion et al., (2011) conducted a study to find out the effects of back massage on pain management for orthopaedic surgical patients.160 patients were selected who met inclusion criteria and divided into two groups. Pre and posttest level of pain was assessed by numerical rating scale. Experimental group received back massage intervention for 20 minutes. The results showed that patients received back massage had significantly decreased pain scores after massage ($p < 0.001$). They concluded that Patients and staff were highly satisfied with having massage therapy available, and no major barriers to implementing massage therapy were identified.

The investigator as a nurse during her clinical experience period has come across many patients suffering from agonizing pain and discomfort during post orthopaedic surgery. Investigator found that patients who have undergone orthopaedic surgery suffered from pain and discomfort during their recovery period due to adverse effects of analgesics. On investigating the investigator found majority of patients like to receive non-phamacological pain relief strategies along with routine care. The depth of literature and the information available about the new advancing alternative therapies to manage pain made the investigator to double her interest towards the use of back massage to reduce pain among patients undergone orthopedic surgeries.

STATEMENT OF THE PROBLEM

A quasi experimental study to assess the effectiveness of back massage in reducing post operative pain and improving quality of recovery among patients undergone orthopedic surgery at selected hospitals in Dindigul district.

OBJECTIVES OF THE STUDY

1. To assess the pre and post test level of pain and quality of recovery among patients undergone orthopedic surgery in the control and experimental group

2. To evaluate the effectiveness of back massage on the level of pain and quality of recovery among patients undergone orthopedic surgery in experimental group.

3. To correlate the level of pain with quality of recovery among patients undergone orthopedic surgery in the control and experimental group

4. To find out the association between level of pain among patients undergone orthopedic surgery and their selected demographic variables in control and experimental group.

5. To find out the association between level of quality of recovery among patients undergone orthopedic surgery and their selected demographic variables in control and experimental group.

HYPOTHESIS

H_1-The mean post test level of pain will be significantly lower than the mean pre test level of pain among patients undergone orthopedic surgery in the experimental group

H_2-The mean post test level of pain in experimental group will be significantly lower than the mean post test level of pain in control group among patients undergone orthopedic surgery.

H_3- The mean post test level of quality of recovery will be significantly higher than the mean pre test level of quality of recovery among patients undergone orthopedic surgery in the experimental group

H_4-The mean post test level of quality of recovery in experimental group will be significantly higher than the mean post test level of quality of recovery in control group among patients undergone orthopedic surgery.

H_5- There will be a significant correlation between level of pain and quality of recovery among patients undergone orthopedic surgery in the control and experimental group.

H_6-There will be a significant association between the level of pain among patients undergone orthopedic surgery and their demographic variables in control and experimental group.

H_7-There will be a significant association between the level of quality of recovery among patients undergone orthopedic surgery and their demographic variables in control and experimental group.

OPERATIONAL DEFINITION

EFFECTIVENESS

In this study effectiveness refers to the extent to which back massage has achieved desirable changes in the level of post operative pain and quality of recovery

among patients undergone orthopedic surgery measured by visual analog scale and modified post operative quality of recovery-20 scale.

BACK MASSAGE

Back massage is the manipulation of superficial and deeper layers of muscle and connective tissue using techniques like effleurage, petrissage, tapotement, friction with coconut oil given for 15-20 minutes two times a day for the first, second and third post operative days.

POST OPERATIVE PAIN

Post operative pain is a complex response to tissue trauma during surgery that stimulates hypersensitivity of the central nervous system which is measured by using visual analog scale.

QUALITY OF RECOVERY

Recovery from surgery is the sequence of steps that occurs from the point at which you awake from anesthesia to the point at which you are fully healed. The path of recovery is different in different patients and varies with the type of procedure which is measured by Modified Post operative Quality of Recovery-20 scale.

ORTHOPEDIC SURGERY

Patients undergone surgery that deals with the fracture reduction, knee replacement, hip replacement, plate removal.

ASSUMPTION

This study assumes that

- Back massage is an easy and executable method for treating pain in all medical care centers and even at patient's home.
- Massage is considered as a safe and effective intervention for reducing orthopedic surgical pain.
- Back massages relax the body tissues and mind there by reducing orthopedic surgical pain.

DELIMITATION

The study was limited to

- who have undergone orthopedic surgery
- who are in 1-3rd post operative day
- data collection period of 6 weeks
- who are willing to participate in the study

PROJECTED OUTCOME

This study will be able to assess the effectiveness of back massage in reducing post operative pain and improving quality of recovery among patients undergone orthopedic surgery.

CHAPTER II

REVIEW OF LITERATURE

A literature review involves the systematic identification, location, scrutiny and summary of written materials that contain information on a research problem**.**

It provides basis for future investigations that justifies the need for the study, throws light on the feasibility of study. This chapter has review of studies done, methodology adopted and conclusion obtained are mostly from text books, journals and internet searches.

The literature review related to this study was discussed under the following heading;

- Studies related to incidence of orthopedic surgery
- Studies related to pain severity on orthopedic surgery
- Studies related to need for increased amount of analgesics among orthopaedic surgical patients
- Studies related to ill-effects of analgesics
- Studies related to effectiveness of back massage in reducing postoperative pain and improving quality of recovery among patients undergone orthopedic surgery

Studies related to incidence of orthopaedic surgery

Mayo Clinic (2014) conducted a first nationwide prevalence study of hip and knee arthroplasty showed 7.2 million Americans living with implants. In 2010, 4.7 million Americans have undergone total knee arthroplasty (TKA) and 2.5 million have undergone total hip arthroplasty (THA) and are living with implants. Prevalence is higher in women than in men: 3 million women and 1.7 million men are living with TKA, and 1.4 million women and 1.1 million men are living with THA. Prevalence increases with age. In adults ages 80 to 89 years, about 6% and 10% have a history of total hip and knee replacement, respectively.

Alexander M. Weinstein, BA et al., (2013) stated the Burden of Total Knee Replacement in the United States. They collected data from primary and revision total knee replacement among adults fifty years of age or older in the U.S. They indicated that 4.0 million adults in the U.S. currently live with a total knee replacement, representing 4.2% of the population fifty years of age or older. The prevalence was higher among females (4.8%) than among males (3.4%) and increased with age. The lifetime risk of primary total knee replacement from the age of twenty-five years was 7.0% for males and 9.5% for females. They concluded that total knee replacement is considerably more prevalent than rheumatoid arthritis. Nearly 1.5 million of those with a primary total knee replacement are fifty to sixty-nine years old, indicating that a large population is at risk for costly revision surgery as well as possible long-term complications of total knee replacement.

Jason Samona et al., (2012) conducted an Epidemiological-Based Investigation of orthopaedic problems in Tamil Nadu. Data was collected regarding orthopedic diseases by interview method. Results showed that, 77% of the study population reported some form of disability. 48.6% of the subjects indicated some

form of disability in the extremities. 87.1% of the study population undergone orthopedic surgical procedures on the extremities.

Robert H. Haralson, MD, MBA et al., (2009) conducted an epidemiological study about major Orthopaedic Surgery worldwide among elderly population. Data monitored and stated that increase in the number of major orthopaedic surgeries between 2010 and 2020 in the US, Japan, France, Germany, Italy, Spain, and the UK. The number of orthopaedic surgeries is expected to increase from approximately 5,284,000 surgeries in 2010 to 6,556,000 surgeries in 2020. In 2010, Data monitored that the number of orthopaedic surgeries are differ significantly by age group. In the seven major markets, approximately 106,900 surgeries in those under the age of 15 years , 579,300 in those between 15 and 44 years and 1,547,400 in those between 45 and 64 years and 3,050,100 surgeries in those over the age of 65 years. They concluded that hip replacement surgery is the most common surgery among the elderly. It is the most commonly performed orthopaedic surgery overall, despite being almost exclusively limited to those over the age of 50.

Studies related to pain severity on orthopaedic surgery

Maren F Lindberg MSc, RN et al., (2013) conducted a cross sectional survey on Pain characteristics and self-rated health after elective orthopaedic surgery. 123 elective orthopaedic inpatients recruited consecutively and Patients were divided into three diagnostic groups: shoulder surgery, hip or knee replacement and other surgery. Patients have completed items about pain intensity. The results showed that Mean age was 60 years (SD 17·2) and 50% were females. Average pain intensity was 4·2 (SD 2·2) on a 0–10 numeric rating scale and 60% reported moderate/severe pain during the entire hospital stay. Shoulder surgery patients reported significantly higher

pain intensity compared to other surgical groups. Pain interfered mostly with daily activity and sleep. Quality of recovery was significantly associated with occupation and administration of analgesics. Higher pain intensity was significantly associated with poorer self-rated health. They concluded that High pain intensity is related to poorer self-rated health. Postoperative pain is under managed, affects functional areas and could delay rehabilitation.

Hans J. Gerbershagen M.D., PhD et al., (2013) conducted a Prospective Cohort Study to assess the Pain Intensity on the First Day after Surgery; Comparing 179 Surgical Procedures.50,523 patients were selected from 179 surgical groups and they were compared. On the first postoperative day, patients were asked to rate their worst pain intensity since surgery by numeric rating scale, 0–10. Results showed that patients had highest pain scores (median numeric rating scale, 6–7) in 40 surgical procedures and patients with orthopedic problems had worst pain after surgery.They concluded that patients suffering from severe pain after orthopaedic surgery and various treatments need to reduce post operative pain.

V. Wylde et al., (2011) conducted a study on acute postoperative pain at rest after hip and knee arthroplasty. 105 patients were selected who met inclusion criteria. Pain was assessed preoperatively and then five times daily for the first three postoperative days by using a pain Visual Analogue Scale and short-Form McGill Pain Questionnaire. Results showed that median acute pain scores peaked on the first postoperative day, with 58% of TKR patients and 47% of THR patients reporting moderate-severe pain. Preoperative pain was most frequently described as aching, stabbing and sharp, whereas acute postoperative pain was described as aching, heavy

and tender. Night pain disturbed between 44–57% of TKR patients and 21–52% of THR patients on postoperative nights 1–3.

Loretta B. Chou, MD, (2008) conducted a Prospective Study on Postoperative Pain Following Foot and Ankle Surgery. 104 consecutive preoperative orthopaedic foot and ankle surgery patients were asked to participate in this pain survey. We evaluated the results of 98 patients. There were 48 women and 50 men. The average age was 46.5 (range, 17 to 85). There were 47 patients with chronic conditions (such as deformities, arthritis), 32 with acute problems (fractures, recent injuries), 16 with hardware removal, and two with sports injuries. Pain level was assessed by Short-Form McGill Pain Questionnaire and Visual Analog Scale. Patients were given a SF-MPQ at each of three different time points: (1) 1 to 7 days before the operation (Preoperative Pain) when they did not take pain medication and were asked about their Anticipated Postoperative Pain, (2) 3 days postoperatively, and (3) 6 week afterthe operation. They concluded that patients with postoperative pain severity experienced greater than pre-surgical pain severity and finally, orthopedic patients had the highest incidence of pain.

Studies related to need for increased amount of analgesics among orthopaedic surgical patients

Margaret P. Ekstein MD et al., (2011) conducted a cohort study on immediate postoperative pain in orthopaedic patients is more intense and requires more analgesia than in post-laparotomy patients.325 samples were selected and pain level was obtained by using visual analog scale. The results showed that the overall rate of immediate severe postoperative pain was 9.4% and 123 (6.6%) of subjects were laparotomy patients and 202 (12.7%) of subjects

were orthopedic patients. Pain in the laparotomy patients identified as suffering from severe pain was controlled with 1.21 ± 0.45 doses of analgesics compared with 1.37 ± 0.62 ($P < 0.0001$) in the orthopedic counterparts. They were concluded that patients suffered from severe immediate postoperative pain in orthopaedic surgery than laparotomy surgery and orthopaedic patients required more analgesia than that dictated by existing PACU analgesia protocols.

Ingrid Tennant et al (2009) conducted a survey on the post-operative pain experience and an assessment of analgesic administration in elective surgical patients at a teaching hospital in kingston, jamaica**.** 499 patients were participated and in that 290 gynecological and 209 orthopedic patients. Data was collected by trained personnel via a postoperative interview and review of in-patient charts 24 to 48 hours after anesthesia. A verbal numerical rating scale (VNRS) of 0 to 10 was used to assess pain severity. Result showed that the majority of patients had general anesthesia (80.5%). No pain was reported by 10.6% of patients, 20.8% had mild pain (scores of 1-3), 26.3% had moderate pain (4-6), and 42.3% experienced severe pain (7-10). Younger patients (<60 years) and those having undergone orthopedic procedures reported more severe postoperative pain ($p<0.001$ and $p=0.001$ respectively). Opioid analgesics were administered as ordered in only 33.9% of orthopedic surgical patients and gynecological patients were less likely to receive opioids at the prescribed dosing intervals ($p<0.001$). Most patients at this institution still experience moderate to severe pain postoperatively. They concluded that, need for greater resources to control the acute pain in the peri-operative period.

Sigma Theta Tau International, (2009) conducted a study to assess need of analgesics on postoperative pain of patients undergone elective abdominal surgery

and orthopaedic surgery. A quasi-experimental design was used and convenient samples of 60. Pain was measured by Verbal Rating Scale. Analgesics was administered as per patient's pain level and intensity of pain was monitored before and immediately after analgesics administration, during the 1st and 2nd postoperative day for both the groups. Results revealed that those patients undergone ortho surgery had significant differences ($p<0.001$) in pain scores when compared to the abdominal surgery. The conclusion of study showed that need of analgesics was increased with Patients undergone orthopedic surgery.

McDonagh (2008) conducted a study on postoperative pain severity and analgesics after abdominal or orthopaedic surgery .They have selected 60 persons who underwent total abdominal hysterectomy (TAH), total hip or knee replacement (THR, TKR) and pain level was completed by a modified version of the American Pain Society (APS),Quality Improvement questionnaire within 24 hours before leaving the hospital. Pain was rated on a 0 (no pain) – 10 (worst pain possible) analog scale. Result showed that Mean age was 43.7 years for TAH (n 7), 55.0 years for THR (n 4), and 61.8 years for TKR patients (n 6). Mean length of stay (days) was 3.6 overall, 3.2 for TAH, 3.8 for THR, and 4.2 for TKR. Mean pain levels were 3.2, 4.1 and 2.2 for persons after TAH, THR, and TKR, respectively. Mean worst pain was 7.8, 9.1 and 8.0 for TAH, THR, and TKR patients, respectively. Pain was most severe on the first or second day after surgery for 86.7%, 75.0%, and 100% of TAH, TKR, and THR patients, respectively and they need increase dose of analgesics for patients with ortho surgery compare than abdominal surgery. They concluded that Postoperative pain was most severe on the first and second days after ortho surgery than abdominal surgery.

Studies related to ill-effects of analgesics

Benyamin R et al., (2008) indicated the role of opioids in the treatment of chronic pain after orthopaedic surgery is also influenced by the fact that these potent analgesics are associated with a significant number of side effects and complications. Common side effects of opioid administration include sedation, dizziness, nausea, vomiting, constipation, physical dependence, tolerance, and respiratory depression. . Less common side effects may include delayed gastric emptying, hyperalgesia, immunologic and hormonal dysfunction, muscle rigidity, and myoclonus. The most common side effects of opioid usage are constipation (which has a very high incidence) and nausea. These 2 side effects can be difficult to manage and frequently tolerance to them does not develop; this is especially true for constipation. They concluded that Proper patient screening, education, and pre-emptive treatment of potential side effects may aid in maximizing effectiveness while reducing the severity of side effects and adverse events. Opioids can be considered broad spectrum analgesic agents, affecting a wide number of organ systems and influencing a large number of body functions.

Keith Candiotti, MD et al., (2007) stated the use of analgesics in post operative orthopaedic pain management. Adverse reactions to analgesics can be a limiting factor in the effective use of these drugs. In a study of patients taking analgesics for prolonged periods of time, 80 percent of patients reported at least 1 adverse event, and 24 percent of patients discontinued therapy due to an adverse event.Evaluation of the discontinuations due to adverse events demonstrated that constipation (41 percent), nausea (32 percent), vomiting (15 percent), and somnolence (29 percent) were the most common reasons cited for cessation of therapy.

Joseph et al., (2006) conducted a study on adverse effects among primary care patients taking opioids for pain after orthopaedic surgery. A prevalence study was conducted on a sample of 1,009 patients (889 receiving chronic opioids) being treated by 235 primary care physicians. Standardized questionnaires and medical record reviews were used to assess rates of pain diagnosis and severity, opioid adverse effects, and mental health. The mean daily dose of opioids was 92 mg using a morphine-equivalent conversion. Side effects included constipation (40 percent), sleeping problems (25 percent), loss of appetite (23 percent), and sexual dysfunction (18 percent), with patients on daily opioids experiencing more side effects than subjects on intermittent medication. They concluded that Physicians should closely monitor patients for adverse effects and adequacy of pain control.

Studies related to effectiveness of back massage in reducing postoperative pain and improving quality of recovery among patients undergone orthopaedic surgery.

Glenda Keller (2012) conducted a study to evaluate the effects of back massage after decompression and fusion surgery of lumbar spine among clients with 47 years old female who underwent spinal surgery due to chronic disc herniation symptoms. Data was obtained by using visual analog scale and Hamstring length scale.30 minutes back massage and myofacial technique were applied to the experimental group. The results showed that pre and post test values are significantly different at $p< 0.001$. They concluded that massage for pain had short term effects and have positive effects in the reduction of pain and disability.

Funda Buyukyilmax PhD, RN and TurkinazAski PhD, RN (2011) conducted a study to assess the effectiveness of Relaxation techniques and Back

massage on pain and anxiety in hip or knee arthoplasty patients. 60 patients were randomly assigned to either experimental and control group. The Mc Gill pain questionnaire short form and state anxiety, vital signs inventory were used to measure the pain level before and after intervention.30 minutes back massage and relaxation techniques received by experimental group. The results showed that statistically significant difference in pain intensity (F=14.50; P=0.0001), Anxiety level (F=19.13; P=0.0001) and vital signs (F=169.61; P=0.0001) between control and experimental group. They were concluded that use of back massage and relaxation techniques at bed rest times of patients to decrease pain and anxiety. It should be implemented by nurses into routine plan of care for patients.

Eghbali M, Lellahgani H et al., (2010) conducted a study to evaluate the effectiveness of back massage on pain severity in orthopaedic surgical patients.60 arthroscopic knee surgical patients were selected and they were randomly divided into experimental and control group. In experimental group, patients were massaged by researcher along with bed side routine treatments for 5 weeks. Pain severity was evaluated before and after the massage therapy by using visual analog scale. Data analysis revealed a meaningful difference between mean score of pain severity before and after the massage in intervention group. The result showed that back massage is one of the effective treatments for reducing pain in orthopedic surgical patients.

Mary Walton et al., (2009) conducted a study to find out the immediate effects of effleurage back massage on physiological and psychological relaxation of orthopaedic surgical patients. 60 adult clients were selected by purposive sampling technique. They were divided into two groups of experimental and control. Data was obtained by using visual analog scale, Anxiety scale and Vital signs inventory scale and patients were turned to back massage who were in experimental group.

Physiological and psychological parameters were assessed after 5th and 30th minutes of back massage. Data analysis revealed that comparison of physiological and psychological parameters before and after back massage. T value was 2.58 at 0.05 levels. Finally they concluded that massage was effective in all the physiological and psychological parameters (Pain, Anxiety, Vital signs) and nurses could implement this intervention along with routine treatment.

Mitchinson.AR et al (2007) conducted a randomized trial study to assess the acute post operative pain management using massage as an adjuvant therapy for orthopaedic patients. 605 patients were selected and divided into 2 groups like (i) control (routine care) (ii) back massage given (20 minutes) for 5 post operative days. Results showed that compared with control group, patients in the massage group experienced short term decrease in pain intensity (P=0.001) and patients in back massage group experienced a faster rate of decrease in pain intensity (P=0.02).

Esther Moke and Chin Pang Woo (2004) conducted a study to assess the effects of slow back massage on shoulder pain and anxiety among patients undergone plate removal surgery. 102 patients were selected randomly and assigned to experimental and control group. The intervention consisted of 10 minutes back massage for 7 consecutive evenings among experimental group. Results showed that massage intervention significantly reduced the patient's level of pain perception and anxiety and improved their quality of recovery. It was an effective nursing intervention for reducing shoulder pain and anxiety in patients with plate removal.

CONCEPTUAL FRAMEWORK

Polit and Hungler stated that the conceptual framework is inter related concepts on abstractions that are assembled together in some rational by virtue of this relevance to a common scheme. It is a device that helps to stimulate research and the extension of knowledge by providing both direction and impetus.

The present study was aimed at determining the effectiveness of back massage in reducing post operative pain and improving quality of recovery among patients undergone orthopedic surgery. The conceptual framework of this study was derived from Gate control theory.

Gate control theory of pain

The gate control theory first postulated by Ronald Melzack and Patrick David Wall in 1965. This theory suggests that for pain to pass through the gate there must be unopposed passage for nociceptive information arriving at the synapses in the substantia gelatinosa. The pain impulses will be carried out by the small diameters, slow conducting A, œ and C fibres. Impulses travelled through small diameter fibres will open the pain gate and the person feels pain. Pain gate is also receiving impulses produced by stimulation of thermo receptors or mechano receptors transmitted via large diameter myelinated A, ß fibres inhibit and super impose the small diameter impulse. Many non-pharmacological procedures such as application of pressure, TENS stimulate the nerve endings connected with large diameter fibres which can produce a reduction of pain by closing the pain gate.

If nociceptive information is allowed through the gate then this traffic will continue up the lateral spino-thalamic tract of the spinal cord to the thalamus, and

from here to the cerebral cortex. As this stimulus passes through the brain stem it may cause an interaction between the grey matter and the mid brain, hence transmitting the pain. Suppression system and their descending neurons can release an endogeneous opiate substance into substantia gelatinosa at spinal cord level. The chemical nature of this endogenous opiate, which may be endorphin or encephalin, is such as to cause inhibition of transmission in the nociceptive circuit synapses. This is achieved by blocking the release of the chemical transmitter (substance P) in the pain circuit.

Based on the principles of gate control theory, the conceptual framework was developed. Methods used to reduce the pain are influenced by selected variables such as age, gender, education, occupation, history of previous surgery, types of analgesics used, frequency of analgesics administration, types of ortho surgery, types of anesthesia.

Post operative pain:

Post operative pain is caused by the interaction of number of physiologic and psychologic factors. The skin and underlying tissue have been traumatized by the incision and retraction during surgery.

PATHOPHYSIOLOGY

Physiologic processes, including the activity of neuro transmitters, are operative at multiple site along this structural pathway to aid in conveying the signal. This process is referred to as nociception. Nociceptive process begins at peripheral level. When damage occurs, biochemical agents that initiate and sensitize the nociceptive response are released. These agents include potassium, substance P,

bradykinin, prostaglandin and others. The initial injury provokes a series of physiologic events;

Modulation

Injury ⟶ **Transduction** ⟶ **Transmission** ⟶ **Perception**

The Nociceptive Process

The sensory experience of pain depends on interaction between the nervous system and the environment.

GATING MECHANISM:

During the post operative period pain impulses are transmitted through spinal nerve segment of $T_{11\text{-}12}$ and accessory lower thoracic and upper lumbar sympathetic nerve which are travelled through(A ,œ and C) small diameter and slow conducting myelinated fibres and reach the pain gate and open the gate ,thus patient perceives pain. Impulses from back massage travels through fast conducting myelinated A, ß fibres which super impose small fibres and closes the pain gate and endorphin which is released from the inter neuron at spinal cord level which also closes the gate of pain. Thus patient perceives reduction in pain level.

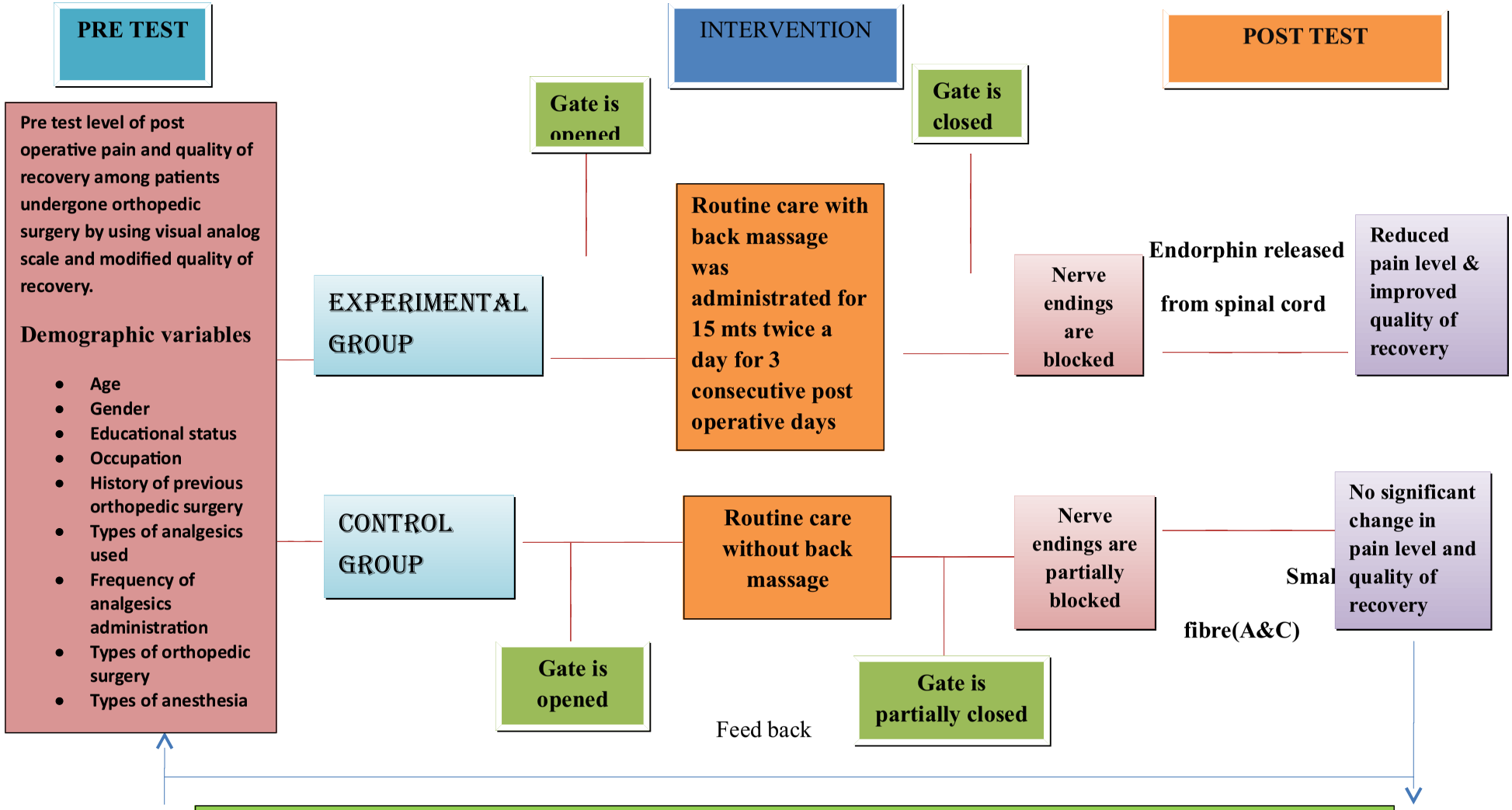


Figure.1: Conceptual Framework based on Modified Wall &Melzack's Gate Control Theory (1965)

CHAPTER-III

METHODOLGY

The methodology of research indicates the general pattern of organizing, the procedure for gathering valid and reliable data for the problem under investigation. **(Polit and Beck, 2010).**

This chapter deals with the research approach ,research design, varibles under the study, setting of the study, population of the study, sample size, sampling technique, criteria for selection of the sample, development and description of the tool, validity and reliability of the tool, pilot study, procedure for data collection and statistical analysis.

RESEARCH APPROACH

The investigator has adopted a quantitative evaluative approach because the aim of the investigator is to determine the effectiveness of back massage in reducing post operative pain and improving quality of recovery among patients undergone orthopedic surgery.

RESEARCH DESIGN

Research design is the overall plan for obtaining an answer, to the research question for testing the research hypothesis**. [Polit and Hungler 1999]**

The research design is quasi experimental non randomized control group pre testpost test design is adopted.

Quasi experimental design involves the manipulation of an independent variable that is an intervention. Quasi experimental design lacks randomization, the signature of a true experiment **(Polit and Beck, 2010)**

The design can be represented based on Level of post operative pain:

Group	Days		pretest	Manipulation	Posttest
Experimental	Day-I	Morning	O_1	X	O_2
		Evening	O_3	X	O_4
	Day-II	Morning	O_5	X	O_6
		Evening	O_7	X	O_8
	Day-III	Morning	O_9	X	O_{10}
		Evening	O_{11}	X	O_{12}
Control	Day-I	Morning	O_1	-	O_2
		Evening	O_3	-	O_4
	Day-II	Morning	O_5	-	O_6
		Evening	O_7	-	O_8
	Day-III	Morning	O_9	-	O_{10}
		Evening	O_{11}	-	O_{12}

Key:

O_1-Morning Pre test level of pain on the first post operative day

O_2- Morning Post test level of pain on the first post operative day

O_3-Evening Pre test level of pain on the first post operative day

O_4-Evening post test level of pain on firstpost operative day

O_5-Morning Pre test level of pain on secondpost operative day

O_6-Morning Post test level of pain on second post operative day

O_7-Evening Pre test level of pain on second post operative day

O_8-Evening post test level of pain on second post operative day

O_9-Morning Pre test level of pain on third post operative day

O_{10}-Morning Post test level of pain on third post operative day

O_{11}-Evening Pre test level of pain on third post operative day

O_{12}-Evening post test level of pain on third post operative day

X - Back massage

The design can be represented based on Level of quality of recovery;

Study subjects	**Pre test**	**Manipulation**	**Post test**
Experimental group	O_1	X	O_2
Control group	O_1	-	O_2

Key:

O_1-Pre test level of quality of recovery on first post operative day

X-Back massage

O_2-Post test level of quality of recovery on third post operative day.

VARIABLES UNDER THE STUDY

INDEPENDENT VARIABLES:

Back massage includes effleurage, petrissage, tapotement, friction.

DEPENDENT VARIABLES

Reducing post operative pain and improving quality of recovery among patients have undergone orthopedic Surgery.

EXTRANEOUS VARIABLES

Demographic variables include Age, Gender, Educational status, Occupation, History of previous surgery, Types of analgesics used, Frequency of analgesics administration, Types of ortho surgery, Types of anesthesia.

SETTINGS OF THE STUDY

The study is conducted among patients undergone orthopedic Surgery at selected hospital in Dindigul. City hospital is selected for experimental group and JCB hospital is selected for control group of this study. JCB hospital is situated around 20 km and City hospital is situated around 25 km from the Sakthi College of nursing. The settings of both hospitals are similar in facilities such as surgical procedures, postoperative care, rooms, environment, daily routine care and activities.

RESEARCH DESIGN
(Quasi experimental research design)

Govt. higher secondary schools at Dindigul

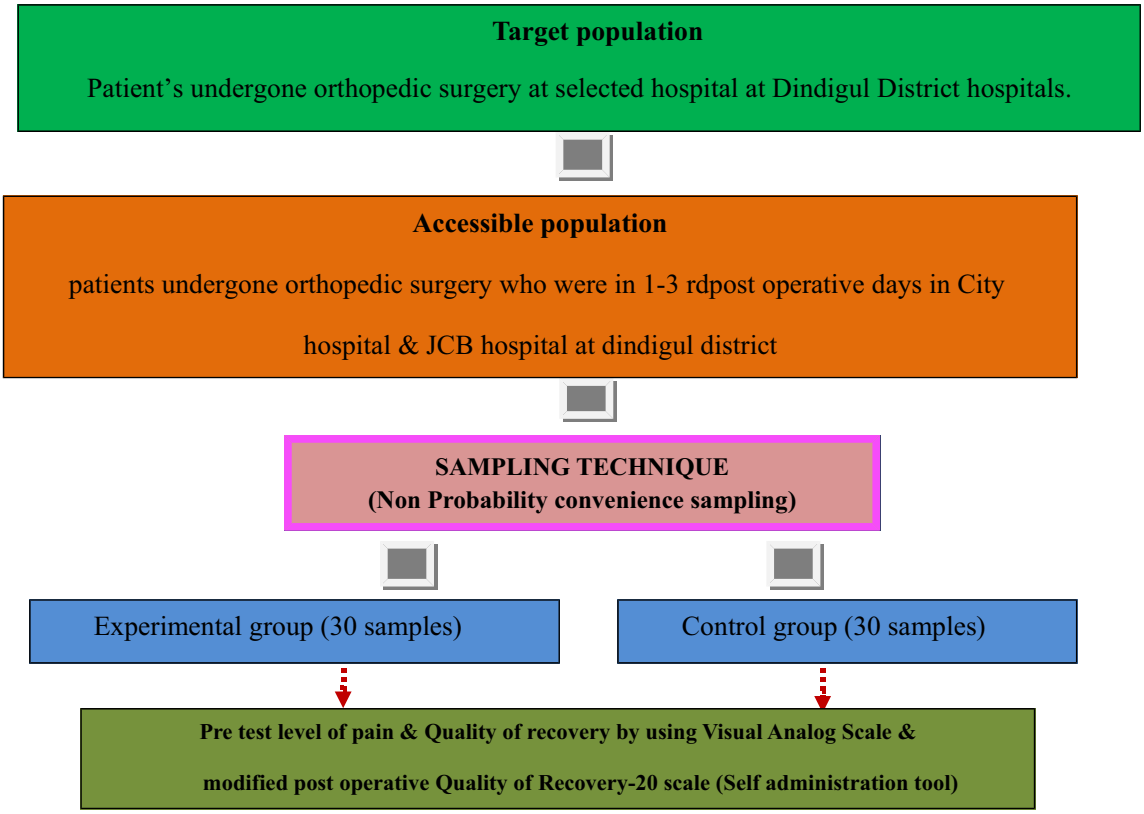
Figure – 2 : Schematic representation of the research methodology

Routine care wit

erative day

& quality of recovery by using Visual Analog Scale & modified post operative Quality of Recovery-20 scale (Self administration tool

Data Analysis and Interpretation by Descriptive and Inferential statistics


Target population
Patient's undergone orthopedic surgery at selected hospital at Dindigul District hospitals.
Accessible population
patients undergone orthopedic surgery who were in 1-3 rdpost operative days in City hospital & JCB hospital at dindigul district
SAMPLING TECHNIQUE
(Non Probability convenience sampling)
Experimental group (30 samples)
Control group (30 samples)
Pre test level of pain & Quality of recovery by using Visual Analog Scale &
modified post operative Quality of Recovery-20 scale (Self administration tool)

Report

POPULATION OF THE STUDY

The **target population** is the group of population that the researcher aims to and to whom the study findings will be generalized. In this study the target population comprises of all patients undergone orthopedic surgery at selected hospitals in Dindigul district.

The **accessible population** of this study is selected patients undergone orthopedic surgeries who were in 1-3rd post operative days at City hospital & JCB hospital in Dindigul district.

SAMPLE

Patients undergone orthopedic surgery of upper and lower extremities who were in 1-3rd post operative days in selected hospitals at Dindigul district.

SAMPLE SIZE

The selected sample size is 60.

30 samples in Experimental group.

30 samples in Control group.

SAMPLING TECHNIQUE

The sampling technique adopted for the study is Convenience sampling technique.

INCLUSION CRITERIA

The study included patients who are

1. Above 20 years of age group

2. Undergone orthopedic surgery of upper and lower extremities and who are in 1-3rd post operative days.

3. Receiving post operative analgesics twice a day

4. Not having back abnormalities and can be able to turn for back massage.

EXCLUSION CRITERIA

The study excluded patients who are

1. Unconscious

2. Using any other complimentary therapies like acupuncture, TENS

3. Unable to read and write Tamil

4. Not willing to participate in the study.

DESCRIPTION OF THE TOOL

Data collection instrument consists of three Sections

Section- I Demographic variables

Section-II Visual analog scale

Section-III Modified Post Operative Quality of Recovery-20 Scale

SECTION I

Demographic variables

Consists of questions to elicit demographic data such as, Age, Gender, Education, Occupation, History of previous surgery, Types of analgesics used, Frequency of analgesics administration, Types of ortho surgery and Types of anesthesia.

SECTION II

Visual analog scale

The visual analog scale (VAS) is one of the most commonly used measures of pain intensity and is usually a horizontal line, 100 mm in length, anchored by word descriptors at each end like no pain to severe pain.

SCORING PROCEDURE:

0-4mm	-	No pain
5-44mm	-	Mild pain
45-74mm	-	Moderate pain
75-100mm	-	Severe pain

SECTION-III

Modified Post Operative Quality of Recovery-20 Scale

The questionnaire consists of 20 items based on modified post operative quality of recovery -20Scale distributed on four pain related dimensions developed for the assessment of quality of recovery after surgery.

Dimension-I : 5-items related to emotional state

Dimension-II : 6-items related to physical comfort

Dimension-III : 4-items related to psychological support

Dimension-IV : 5-items related to physical independence

SCORING INTERPRETATION

For each question score is:

1-worst

2-bad

3-good

4-better

5-best

For positive item question carries 1(worst) to 5(best) and for negative item question carries 5(worst) to 1(best).

Scoring:

20-40 - Poor quality of recovery

41-60 - Average quality of recovery

61-80 - Good quality of recovery

81-100 - Better quality of recovery

VALITY OF THE TOOL:

The validity of tool obtained from the 5 experts in the field of nursing and medicine. The suggestions and advices given by the experts were considered and duly corrected.

RELIABLITY OF THE TOOL

Reliability is the degree of consistency or dependability with which instrument measures the attribute is designed to measure**.**

The reliability of the visual analog scale was assessed by using test retest method.The visual analog scale was reliable at r=0.94 and Modified post operative quality of recovery-20 scale was assessed by using cronbach's alpha formula and was reliable at r = 0.84.Hence the tool was considered for proceeding.

PILOT STUDY

The pilot study was conducted to find out the feasibility of the study. It was conducted among 6 patients undergone orthopedic surgery, 3 were in experimental and 3 were in control group. The results of the pilot study showed that the study was feasible.

PROCEDURE FOR DATA COLLECTION

The investigator got formal permission from the college authority, Sakthi College of nursing and concerned authority of both hospitals. The study participants those who fulfill the inclusion criteria were selected by convenience sampling techniques.30 subjects were assigned in experimental group and 30 in control group.

Brief explanation about the purpose of the study is given to the subjects. Assurance is given that the data will be utilized only for the purpose of the study. Oral consent is obtained from each subject and maintained the confidentiality.

First investigator established the good rapport and introduced the study topic to the patients. The investigator collected data regarding demographic variables. The visual analog scale was used to assess the level of pain in experimental group before each back massage. The back massage was given to the experimental group twice daily for 15-20 minutes on 1-3 post operative days before giving analgesics. The post test was conducted in experimental group 1 hour after each back massage. For control group, the visual analog scale was used to assess the pre test level of pain twice daily for 1-3 post operative days before giving analgesics and post test level of pain was assessed 1 hour of each pre test assessment. The post operative quality of recovery-20 scale was used to assess the pre test level of quality of recovery in research group on first post operative day and the post test level of quality of recovery on third post operative day.

Weeks	**Activity**	**Samples**	
		Control group	**Experimental group**
1st week	Pre test-Post test	14 samples	-
2nd week	Pre test-Post test	16 samples	-
3rd week	Pre test-intervention-Post test	-	10 samples
4th week	Pre test-intervention-Post test	-	11 samples
5th week	Pre test-intervention-Post test	-	9 samples
6th week	Data analysis & interpretation	30 samples	30 samples

STATISTICAL ANALYSIS:

Collected data were ananlyzed by descriptive and inferential statistics. The data related to demographic variables were analyzed by using descriptive measures (frequency, percentage distribution). Inferential statistics of t-test was used to evaluate the effectiveness of back massage on level of pain and quality of recovery. Karl pearson's correlation co-efficient test was used to analyze the correlation between level of pain and quality of recovery. Chi-square test was used to associate the level of pain and quality of recovery among patients undergone orthopedic surgery and their selected demographic variables.

HUMAN RIGHTS PROTECTION:

The study was conducted after getting the approval from the ethical committee. Permission was obtained from authority of both hospitals. The purpose and other details of the study were explained to the study subjects and oral consent was obtained from them.

CHAPTER – IV

DATA ANALYSIS AND INTERPRETATION

This chapter deals with the description of the study subjects, clinical parameters, analysis and interpretation of data collected to evaluate the Effectiveness of Back massage in reducing post operative pain and improving quality of recovery among patients undergone orthopedic surgery at selected hospitals. The data collected were compiled analyzed and interpreted as follows:-

Section-A **:** Distribution of subjects Based on Demographic variables

Section -B **:** Assessment of pre and post test level of pain and quality of Recovery among patients undergone orthopedic surgery in the Control and Experimental group.

Section –C **:** Effectiveness of Back massage on level of pain and quality of Recovery Among patients undergone orthopedic surgery in the Experimental group.

Section –D **:** Correlation between level of pain and quality of recovery among patients undergone orthopedic surgery in the Control and Experimental group.

Section –E **:** **(a)** Association between levels of pain among patients undergone orthopedic surgery and selected demographic **v**ariables.

(b) Association between level of quality of Recovery among patients undergone orthopedic surgery and selected demographic **v**ariables.

Section – A

Table - 1:

Frequency and percentage distribution of demographic variables of patients undergone orthopedic surgery in the experimental and control group.

n=30+30

Demographic data	Experimental group		Control group	
	Frequency	**Percentage(%)**	**frequenc**	**Percentage(%)**
1.Age(in years):				
20-40	6	20	4	13.3
40-60	11	36.6	12	40
60-80	11	36.6	11	36.6
Above 80	2	6.6	3	10
2.Gender:				
Male	13	43.3	16	53.3
Female	17	56.6	14	46.6
3.Educational status:				
Illiterate	9	30	5	16.6
Primary	5	16.6	11	36.6
High school	9	30	9	30
Higher secondary & above	7	23.3	5	16.6

4.Occupation				
Home maker	7	23.3	5	16.6
Private employee	2	6.6	4	13.3
Government employee	5	16.6	7	23.3
Self employed	6	20	6	20
Agriculture	10	33.3	8	26.6
5.History of previous orthopedic surgery	1			4
Yes	3	43.3	12	0
No	17	56.6	18	60
6.Types of analgesics used				
Oral	13	43.3	11	36.6
Parenteral	17	56.6	19	63.3
7.Frequency of analgesics administration		2		3
Once a day	6	0	9	0
Twice a day	24	80	21	70
8.Types of orthopedic surgery				
Upper extremity	10	33.3	13	43.3
Lower extremity	20	66.6	17	56.6
9.Types of anesthesia				
Spinal	23	76.6	25	83.3
General	4	13.3	3	10
Regional	3	10	2	6.6

Table 1 describes the distribution of subjects in experimental and control group according to age, gender, educational status, occupation, history of previous surgery, types of analgesics used, frequency of analgesics administration, types of ortho surgery, types of anesthesia of patients undergone orthopedic surgery.

With regard to age, 11 (36.6%) in experimental group and 12(40%) in control group belonged to the age group of 40 to 60 years and 2 (6.6%) in experimental group and 3(10%) in control group belonged to the age group of above 80 years.

Considering the sex, 17 (56.6%) subjects in the experimental group and 14 (46.6%) in the control group were females and the remaining were males.

In relation to education,9(30%) of them had high school education and 5(16.6%)of them had primary education in experimental group and 9(30%) of them had high school education and 11(36.6%) of them had primary education in control group.

With regard to the occupation, 10(33.3%) were agriculture workers and 2(6.6%) were private employees in experimental group and 8(26.6%) were agriculture workers and 4(13.3%) were private employees in the control group.

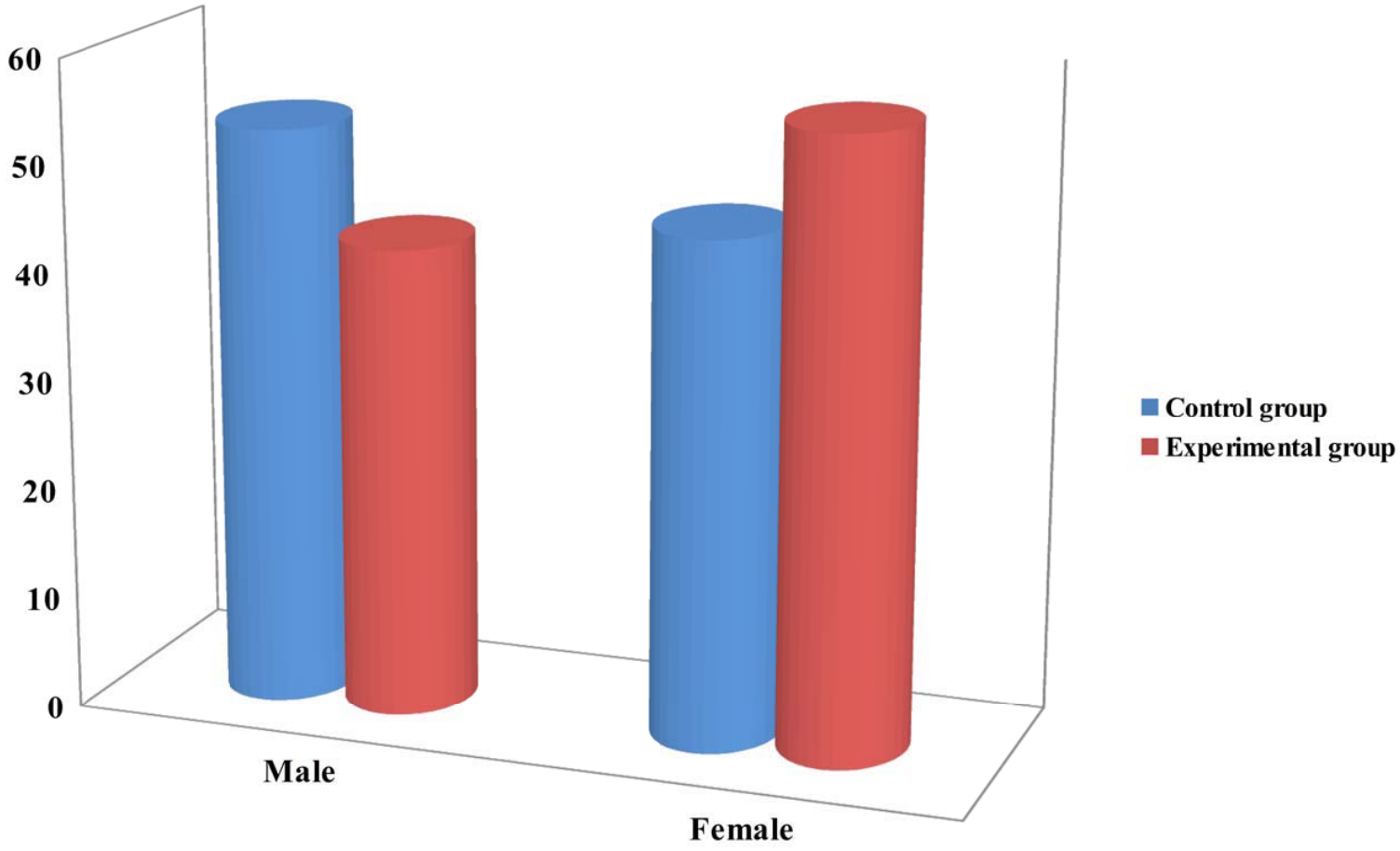
Regarding the history of previous orthopedic surgery, 17(56.6%) in experimental group and 18(60%) in control group had no history of previous orthopedic surgery.

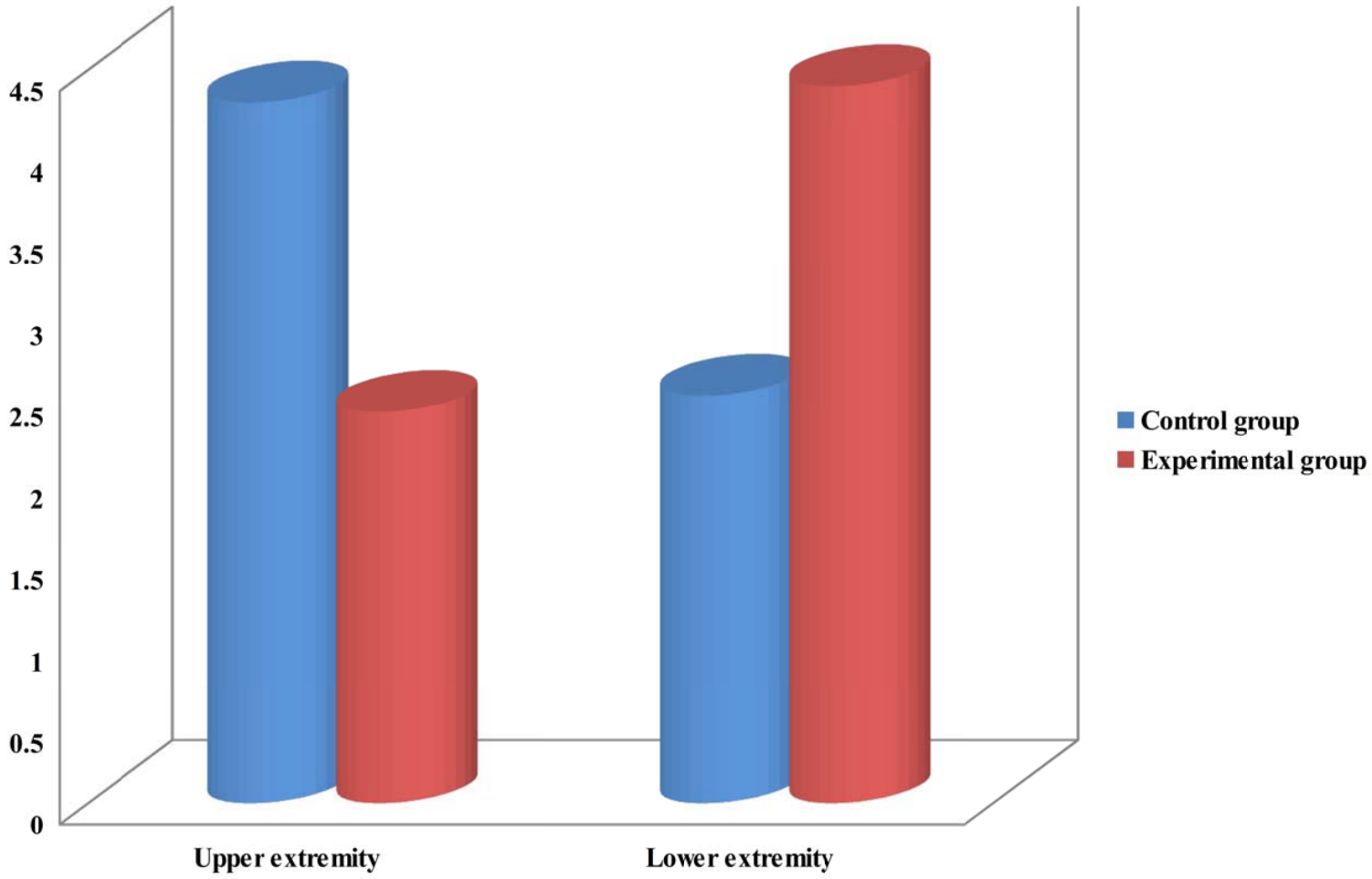
Considering the types of analgesics used, 17(56.6%) subjects in experimental group and19 (63.3%) in control group had parenteral type of analgesics used.

In relation to frequency of analgesics administration, 24(80%) of them in the experimental group and 21(70%) of them in the control group got analgesics twice a day.

With respect to types of orthopedicsurgery,20(66.6%) subjects in experimental group and 17(56.6%) in the control group had lower extremity orthopedic surgery.

With regard to the types of anesthesia, 23(76.6%) subjects in the experimental group and 25(83.3%) of subjects in the control group undergone spinal anesthesia and 3(10%) subjects in the experimental group and 2(6.6%) subjects in the control group undergone regional anesthesia.


60
50
40
30
20
10
0
Male
Female
Control group
Experimental group


4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
Upper extremity
Lower extremity
Control group
Experimental group

SECTION - B

Table – 2

Frequency and percentage distribution of subjects based on pre and post test level of pain in the control group.

n=30

LEVEL OF PAIN	DAY-I				DAY-II				DAY-III			
	Pre Test		Post Test		Pre Test		Post Test		Pre Test		Post Test	
	F	%	F	%	F	%	F	%	F	%	F	%
No Pain	-	-	-	-	-	-	-	-	-	-	-	-
Mild	-	-	-	-	-	-	-	-	-	-	-	-
Moderate	-	-	-	-	-	-	-	-	3	10	3	10
Severe	30	100	30	100	30	100	30	100	27	90	27	90

The table 2 shows that the pre test level of pain in control group on day I and Day-II, all 30 subjects (100%) had severe level of pain and there was no change in the post test level of pain. The pre test level of pain on Day-III, 27(90%) subjects had severe level of pain and there was no change in the post test level of pain.

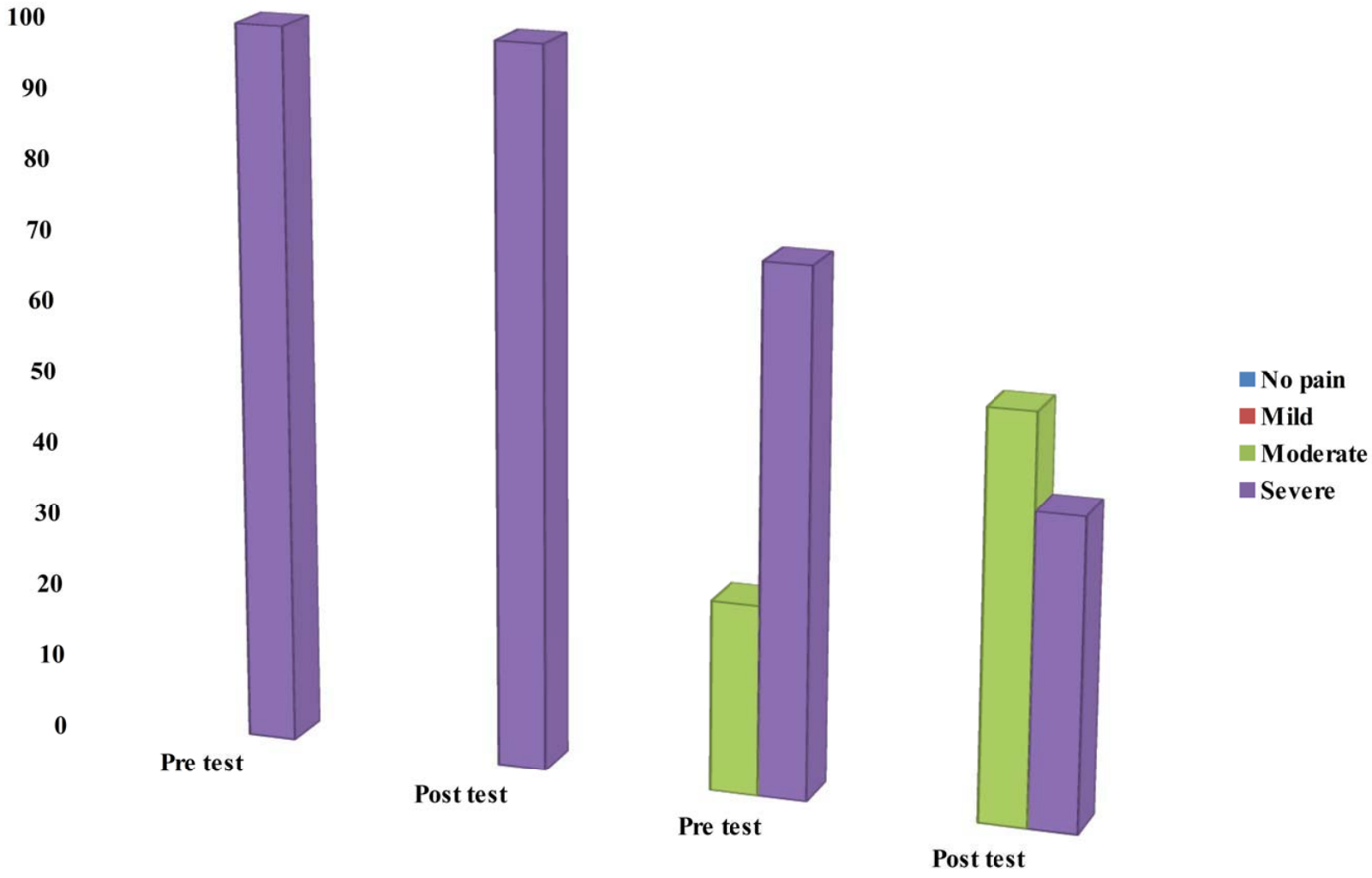
Table – 3

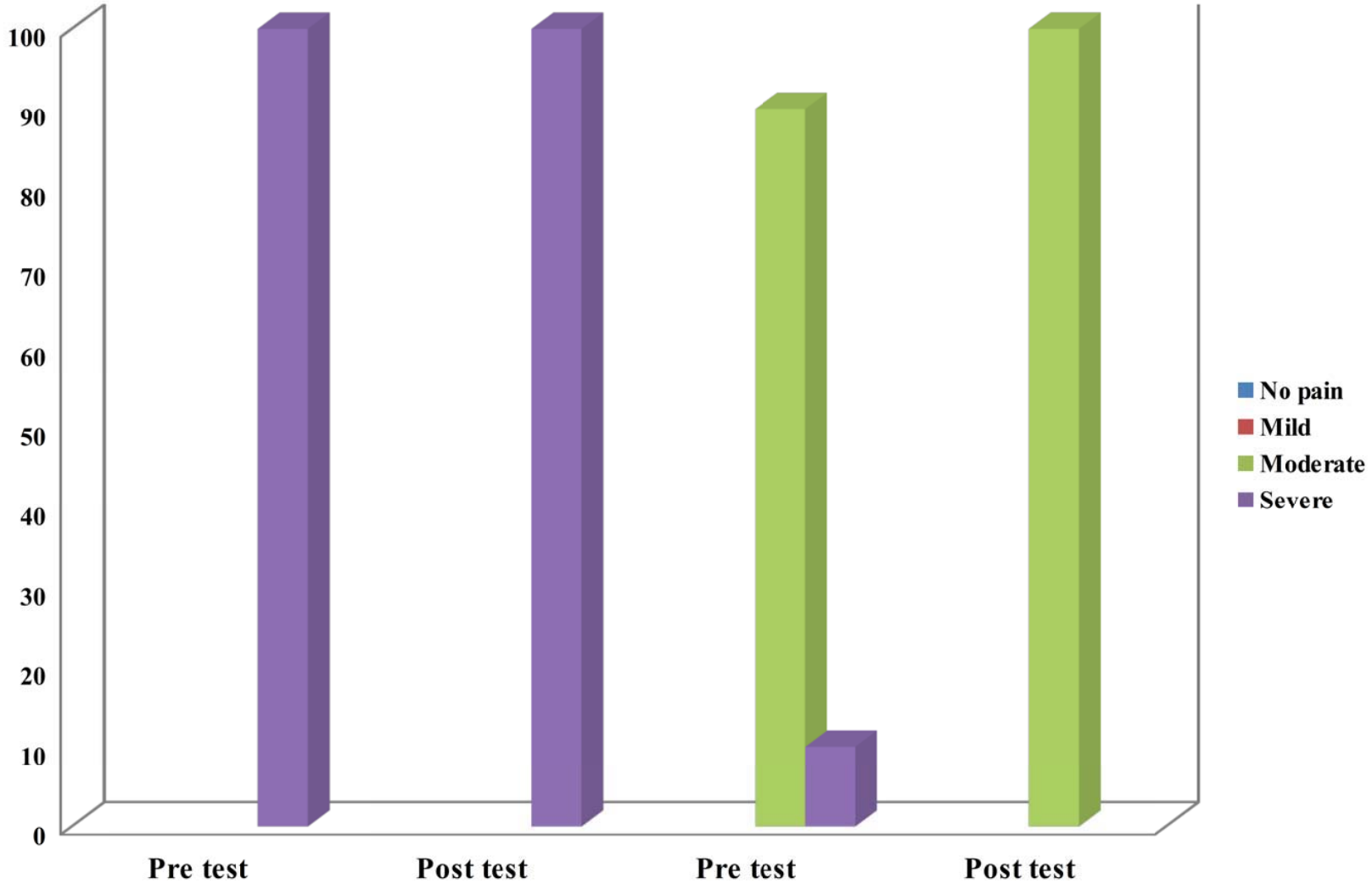
Frequency and percentage distribution of subjects based on pre and post test level of pain in the experimental group.

n=30

LEVEL OF PAIN	DAY-I				DAY-II				DAY-III			
	Pre Test		Post Test		Pre Test		Post Test		Pre Test		Post Test	
	F	%	F	%	F	%	F	%	F	%	F	%
No Pain	-	-	-	-	-	-	-	-	-	-	-	-
Mild	-	-	-	-	-	-	-	-	7	23.3	19	63.3
Moderate	8	26.6	17	56.6	27	90	30	100	23	76.6	11	36.6
Severe	22	73.3	13	43.3	3	10	-	-	-	-	-	-

The table 3 shows that the pre test level of pain on first post operative day 22 subjects (73.3%) had severe level of pain and on third post operative day, 23 subjects (76.6%) had moderate level of pain and the post test level of pain on first post operative day 17 subjects (56.6%) had moderate level of pain, on third post operative day 19(63.3%) had mild level of pain in the experimental group.


100
90
80
70
60
50
40
30
20
10
0
Pre test
Post test
Pre test
Post test
No pain
Mild
Moderate
Severe


100
90
80
70
60
50
40
30
20
10
0
Pre test
Post test
Pre test
Post test
No pain
Mild
Moderate
Severe

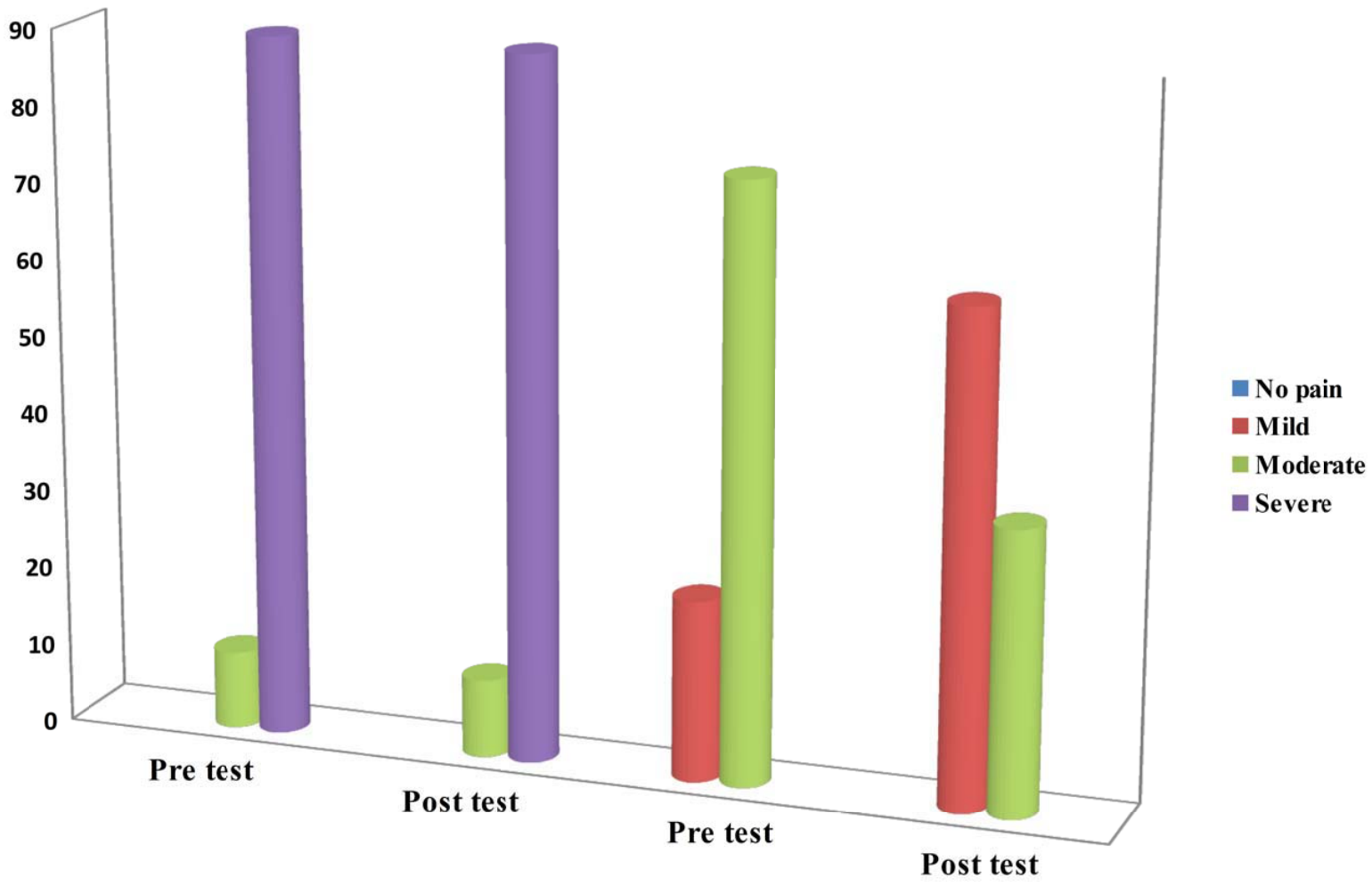

90
80
70
60
50
40
30
20
10
0
Pre test
Post test
Pre test
Post test
No pain
Mild
Moderate
Severe

Table – 4

Frequency and percentage distribution of subjects based on the pre and post test level of Quality of recovery in the control group.

n=30

LEVEL OF QUALITY OF	PRE TEST		POST TEST	
	F	%	F	%
Poor (20-40)	2	6.6	1	3.33
Average (41-60)	28	93.3	29	96.6
Good (61-80)	-	-	-	-
Better (81-100)	-	-	-	-

The table 4 shows that the pre test level of quality of recovery in control group, 28 of them (93.3%) had average level of quality of recovery and 2(6.6%) had poor level of quality of recovery. Whereas in the post test, 29(96.6%) had average level of quality of recovery and 1(3.33%) had poor level of quality of recovery.

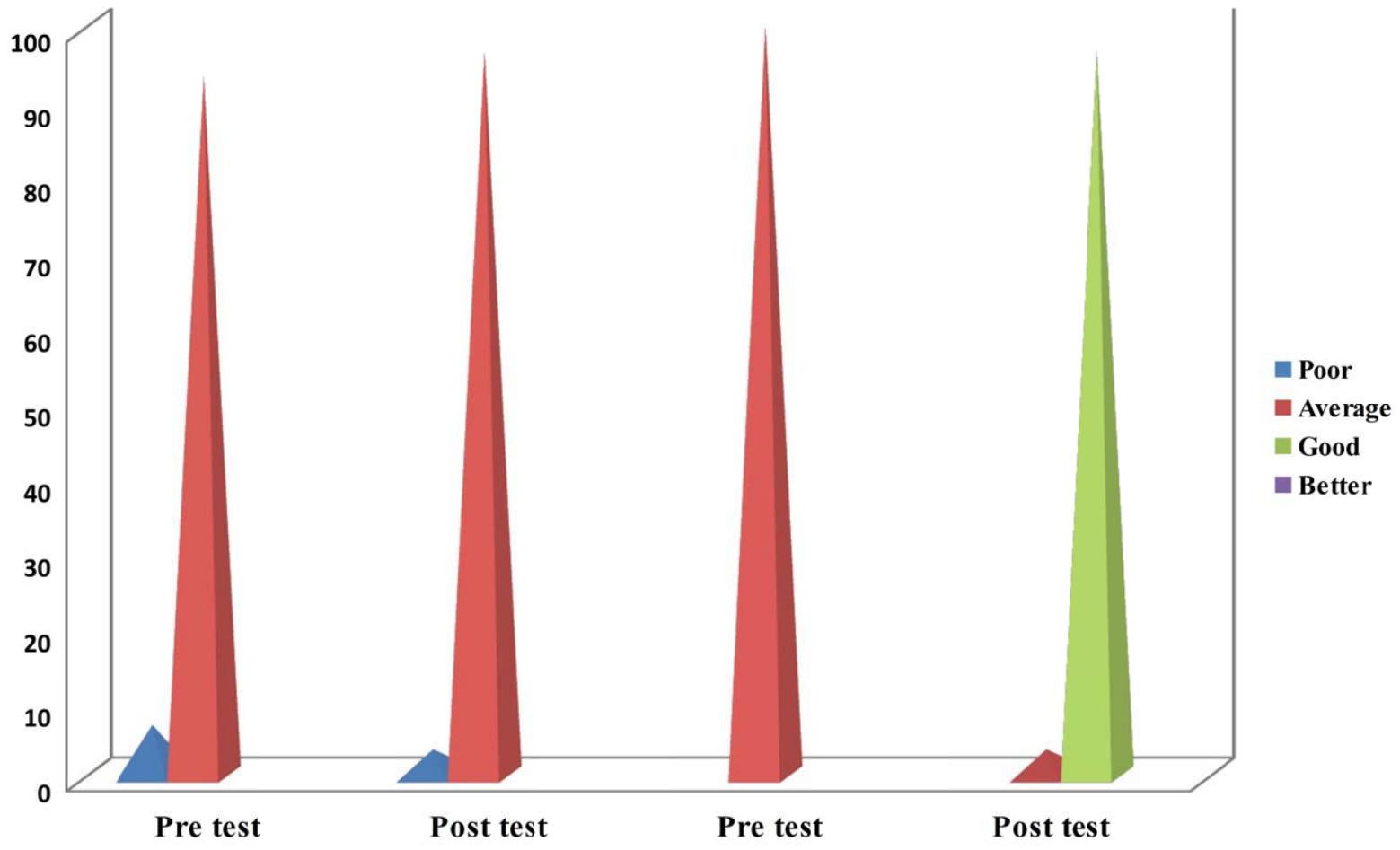
Table – 5

Frequency and percentage distribution of subjects based on pre and post test level of Quality of recovery in the experimental group.

n=30

LEVEL OF QUALITY OF RECOVERY	PRE TEST		POST TEST	
	F	%	F	%
Poor (20-40)	-	-	-	-
Average (41-60)	30	100	1	3.33
Good (61-80)	-	-	29	96.6
Better (81-100)	-	-	-	-

The table 5 shows that the pre test level of quality of recovery in the experimental group, 30 subjects (100%) had average level of quality of recovery and in the post test,29(96.6%) of them had good level of quality of recovery.


100
90
80
70
60
50
40
30
20
10
0
Pre test
Post test
Pre test
Post test
Poor
Average
Good
Better

SECTION - C

Table: 6

Paired‘t’ test of pre and post test level of pain among patients undergone orthopedic surgery in control group.

n=30

LEVEL OF PAIN	Control pre test		Control post test		Mean difference	‘t’-value
	Mean	SD	Mean	SD		
Day-I	84.13	5.34	84.03	5.33	0.1	1.50
Day-II	81.7	5.32	81.6	5.27	0.1	1.00
Day-III	80	5.42	79	5.32	1	1.00

The table 6 shows that the calculated‘t’ values on day-I, II, III in the control groupwere1.50, 1.00, 1.00 which are not significant. It is concluded that there was no significant differences between the pre and post test level of pain among patients undergone orthopedic surgery.

Table: 7

Paired‘t’ test of pre and post test level of pain among patients undergone orthopedic surgery in experimental group.

n=30

LEVEL OF PAIN	Experimental pre test		Experimental post test		Mean difference	't'-value
	Mean	SD	Mean	SD		
Day-I	80	7	73	6.46	7	43.5***
Day-II	64	7.08	57	7.59	7	36.84***
Day-III	49	7.42	42	6.86	7	33***

The table 7 shows that the calculated 't' value on day-I,II,III in the experimental group were 43.5, 36.84, 33 was statistically highly significant at $p<0.001$ level which clearly shows that there was a significant decrease in the level of pain among patients undergone orthopedic surgery after giving back massage. Hence research hypothesis H_1 is accepted.

Table: 8

Unpaired't' test of post test level of pain among patients undergone orthopedic surgery between the control and experimental group.

n = 30

LEVEL OF PAIN	Control post test		Experimental post test		Mean difference	't'-value
	Mean	SD	Mean	SD		
Day-I	84.03	5.33	73	6.46	11.03	7.35***
Day-II	81.6	5.27	57	7.59	24.6	14.64***
Day-III	79	5.32	42	6.86	37	23.41***

(* -P<0.001 highly significant)**

The table 8 shows that the obtained 't' values on day-I, day-II, day-III for level of pain between the control and experimental group is 7.35, 14.64, 23.41 which were highly significant at $p<0.001$ level. These findings revealed that the subjects in experimental group had decreased level of pain after giving back massage compared to control group. Hence research hypothesis H_2 is accepted.

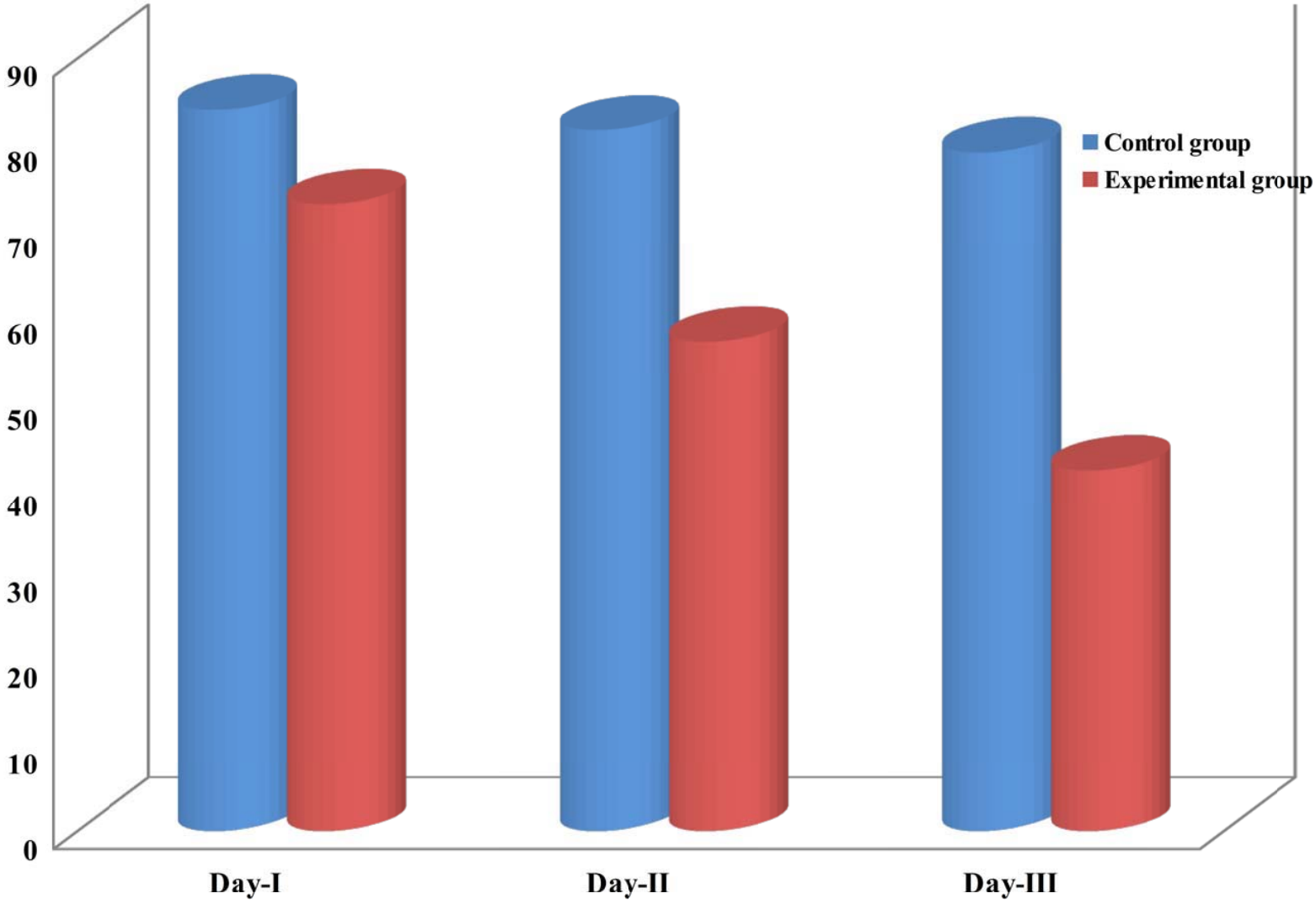

90
80
70
60
50
40
30
20
10
0
Day-I
Day-II
Day-III
Control group
Experimental group

Table : 9

Paired‘t’ test of pre and post test level of quality of recovery among patients undergone orthopedic surgery in control group.

n=30

LEVEL OF QUALITY OF RECOVERY	Control pre test		Control Post test		Mean difference	‘t’-value
	Mean	SD	Mean	SD		
Emotional status	13.9	1.7	13.93	1.65	0.03	1.00
Physical comfort	17.9	1.92	17.93	1.86	0.03	1.00
Psychological support	9.23	1.49	9.16	1.43	0.07	1.44
Physical independence	7.06	2.08	7.13	2.18	0.07	1.75
Over all	48.1	4.64	48.16	4.58	0.06	1.50

(* -P<0.05 significant, * -P<0.001 highly significant)**

The table 9 shows that the over all calculated ‘t’ value of 1.50 was non-significant which clearly revealed that there was no differences between the pre and post test level of quality of recovery among patients undergone orthopedic surgery in the control group.

Table: 10

Paired‘t’ test of pre and post test level of quality of recovery among patients undergone orthopedic surgery in experimental group.

n=30

LEVEL OF QUALITY OF RECOVERY	Experimental pre test		Experimental Post test		Mean difference	't'-value
	Mean	SD	Mean	SD		
Emotional status	13.9	1.68	15.2	1.57	1.3	4.10***
Physical comfort	18.03	1.76	18.93	1.74	0.9	4.73***
Psychological support	9.26	1.41	14.4	1.40	5.14	17.1***
Physical independence	7.13	2.10	20.46	2.65	13.33	24.68***
Over all	48.4	4.27	69	3.67	20.67	21***

(*** -P<0.001 highly significant)

The table 10 shows that the over all calculated't' value of 21 was highly significant at p<0.001level.The pre test mean in case of physical independence was 7.13 whereas the post test was 20.46 and its mean difference was 13.33 which had greater improvement than other parameters. It clearly concluded that there was a significant improvement in the level of quality of recovery among patients undergone orthopedic surgery after giving back massage in the experimental group. Hence research hypothesis H_3 is accepted.

Table : 11

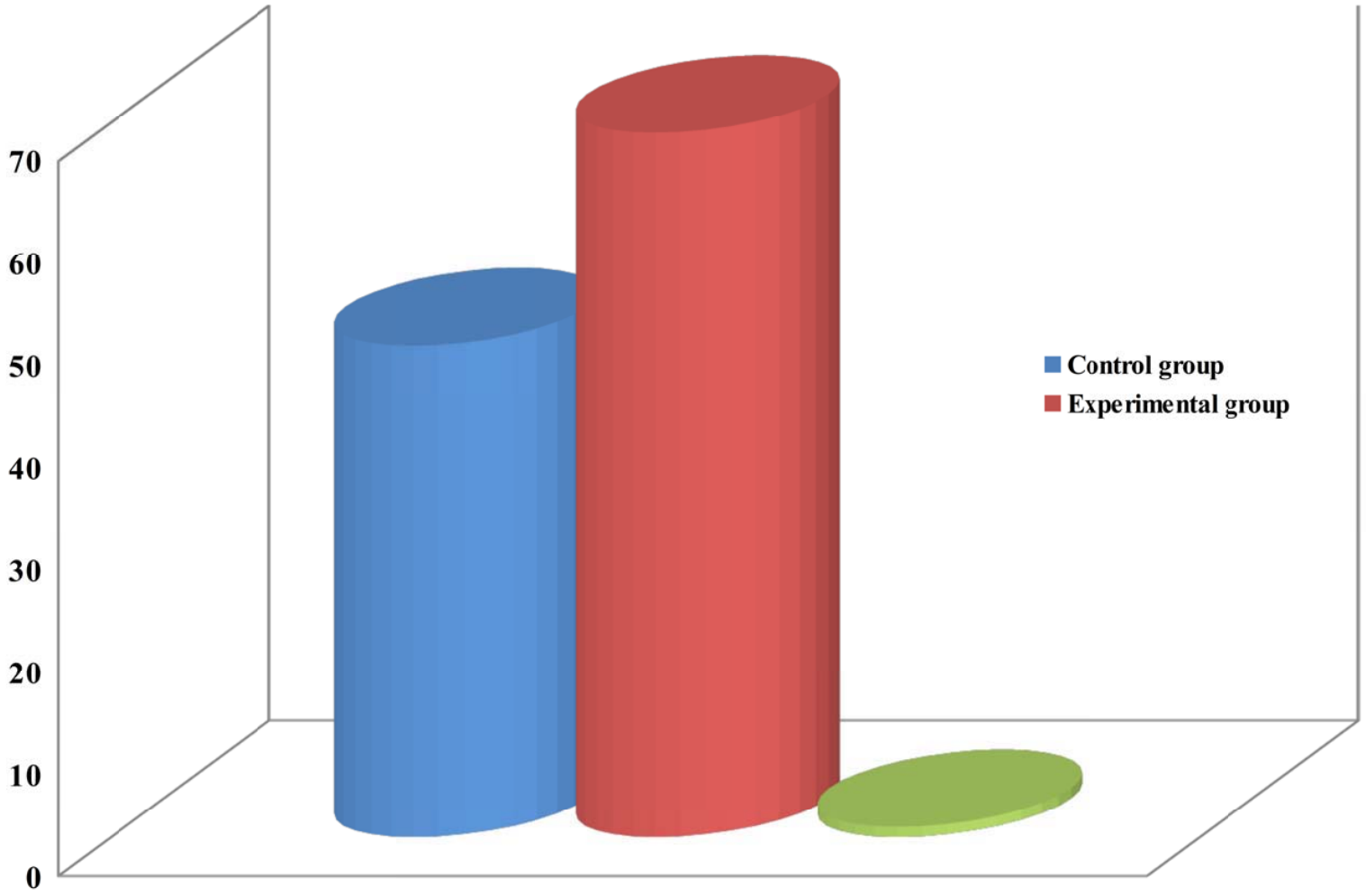
Unpaired't' test of post test level of quality of recovery among patients undergone orthopedic surgery between the experimental and control group

n = 30

LEVEL OF QUALITY OF RECOVERY	Experimental Post test		Control Post test		Mean difference	't'-value
	Mean	SD	Mean	SD		
Emotional status	15.2	1.57	13.93	1.65	1.27	3.17***
Physical comfort	18.93	1.74	17.93	1.86	1.00	2.22***
Psychological support	14.4	1.40	9.16	1.43	5.24	14.5***
Physical independence	20.46	2.65	7.13	2.18	13.33	21.8***
Over all	69	3.67	48.16	4.58	20.84	19.66***

(* -P<0.001 highly significant)**

The table 11 shows that the obtained over all 't' value for level of quality of recovery between the experimental and control group was 19.66 which was highly significant at p<0.001 level. The post test mean of experimental group in case of physical independence was 20.46 whereas in control group was 7.13 and their mean difference was 13.33 which had greater improvement than other parameters. It is concluded that the back massage was highly effective in improving quality of recovery. Hence research hypothesis H_4 is accepted.


70
60
50
40
30
20
10
0
Control group
Experimental group

SECTION - D

Table: 12

Correlation between level of pain and quality of recovery among patients undergone orthopedic surgery in the control and experimental group

Group	"r"-value
Control	**-0.145**
Pre test- level of pain and quality of recovery	
Posttest- level of pain and quality of recovery	**-0.199**
Experimental	**0.168**
Pre test- level of pain and quality of recovery	
Posttest- level of pain and quality of recovery	**-0.420****

The table 12 shows that, there was a negative correlation (r= -0.420) between posttest level of pain and quality of recovery in experimental group at P<0.01 level. It was inferred that there is a significant improvement in quality of recovery as the pain intensity reduced in experimental group. Hence research hypothesis H_5 is accepted.

SECTION - E

T**able: 13**

Association between pre test level of pain among patients undergone orthopedic surgery in the control group with selected demographic variables.

n = 30

Demographic variables	No pain		Mild		Moderate		Severe		X^2-value
	F	%	F	%	F	%	F	%	
1.Age(in years):									
20-40	-	-	-	-	-	-	4	13.3	
40-60	-	-	-	-	-	-	12	40	18.7***
60-80	-	-	-	-	-	-	11	36.6	df=3
Above 80	-	-	-	-	-	-	3	10	
2.Gender:									
Male	-	-	-	-	-	-	16	53.3	17***
Female	-	-	-	-	-	-	14	46.6	df=1
3.Educational status:									
Illiterate	-	-	-	-	-	-	5	16.6	
Primary	-	-	-	-	-	-	11	36.6	15.1*
High school	-	-	-	-	-	-	9	30	df=3
Higher secondary & above	-	-	-	-	-	-	5	16.6	
4.Occupation									
Home maker	-	-	-	-	-	-	5	16.6	
Private employee	-	-	-	-	-	-	4	13.3	6.4
Government employee	-	-	-	-	-	-	7	23.3	df=4
Self employed	-	-	-	-	-	-	6	20	NS
Agriculture	-	-	-	-	-	-	8	26.6	
5.History of previous									

orthopedic surgery	-	-	-	-	-	-	12	40	9.6**
Yes	-	-	-	-	-	-	18	60	df=1
No									
6.Types of analgesics used									
Oral	-	-	-	-	-	-	11	36.6	8.06**
parenteral	-	-	-	-	-	-	19	63.3	df=1
7.Frequency of analgesics administration									
Once a day	-	-	-	-	-	-	9	30	5.4*
Twice a day	-	-	-	-	-	-	21	70	df=1
8.Types of orthopedic surgery									
Upper extremity	-	-	-	-	-	-	13	43.3	11.2**
Lower extremity	-	-	-	-	-	-	17	56.6	df=1
9.Types of anesthesia									
Spinal	-	-	-	-	-	-	25	83.3	41.9***
General	-	-	-	-	-	-	3	10	df=2
Regional	-	-	-	-	-	-	2	6.6	

(NS-Not significant, *P<0.05 – significant, **P<0.01 & ***P<0.001- Highly significant)

The table 13 shows that there was no association between the level of pain and their demographic variable of occupation. There was a significant association between the level of pain and the other demographic variables among patients undergone orthopedic surgery in the control group. Hence research hypothesis H_6 is accepted.

T**able:14**

Association between pre test level of pain among patients undergone orthopedic surgery in the experimental group with selected demographic variables.

n = 30

Demographic variables	No pain		Mild		Moderate		Severe		X^2-value
	F	%	F	%	F	%	F	%	
1.Age(in years):									
20-40	-	-	-	-	2	6.6	4	13.3	
40-60	-	-	-	-	2	6.6	9	30	10.22*
60-80	-	-	-	-	3	10	8	26.6	df=3
Above 80	-	-	-	-	1	3.33	1	3.33	
2.Gender:									
Male	-	-	-	-	4	13.3	9	30	5.35*
Female	-	-	-	-	4	13.3	13	43.3	df=1
3.Educational status:									
Illiterate	-	-	-	-	1	3.33	8	26.6	
Primary	-	-	-	-	1	3.33	4	13.3	5.94
High school	-	-	-	-	3	10	6	20	df=3
Higher secondary & above	-	-	-	-	3	10	4	13.3	NS
4.Occupation									
Home maker	-	-	-	-	3	10	4	13.3	
Private employee	-	-	-	-	-	-	2	6.6	2.32
Government employee	-	-	-	-	1	3.33	4	13.3	df=4
Self employed	-	-	-	-	2	6.6	4	13.3	NS
Agriculture	-	-	-	-	2	6.6	8	26.6	
5.History of previous									6.02

orthopedic surgery	-	-	-	-	6	20	7	23.3	*
Yes	-	-	-	-	2	6.6	15	50	df=1
No									
6.Types of analgesics used									
Oral	-	-	-	-	2	6.6	11	36.6	7.34 **
parenteral	-	-	-	-	6	20	11	36.6	df=1
7.Frequency of analgesics administration									
Once a day	-	-	-	-	-	-	6	20	3.16 df=1
Twice a day	-	-	-	-	8	26.6	16	53.3	NS
8.Types of orthopedic surgery									
Upper extremity	-	-	-	-	3	10	7	23.3	3.00 df=1
Lower extremity	-	-	-	-	5	16.6	15	50	NS
9.Types of anesthesia									
Spinal	-	-	-	-	6	20	17	56.6	21.4***
General	-	-	-	-	1	3.33	3	10	df=2
Regional	-	-	-	-	1	3.33	2	6.6	

(NS-Not significant, *P<0.05 – significant, **P<0.01 & ***P<0.001- Highly significant)

The table 14 shows the there was a significant association between the demographic variables such as age, gender, history of previous surgery, types of analgesics used and types of anesthesia and their level of pain. No other demographic variables were shown any association with their level of pain among patients undergone orthopedic surgery in the experimental group. Hence research hypothesis H_6 partially accepted.

T**able: 15**

Association between pre test level of quality of recovery among patients undergone orthopedic surgery in the control group with selected demographic variables.

n = 30

Demographic variables	Poor		Average		Good		Better		X^2-value
	F	%	F	%	F	%	F	%	
1.Age(in years):									
20-40	-	-	4	13.3	-	-	-	-	
40-60	-	-	12	40	-	-	-	-	8.62*
60-80	1	3.33	10	33.3	-	-	-	-	df=3
Above 80	-	-	3	10	-	-	-	-	
2.Gender:									
Male	-	-	16	53.3	-	-	-	-	27.6***
Female	1	3.33	13	43.3	-	-	-	-	df=1
3.Educational status:									
Illiterate	-	-	5	16.6	-	-	-	-	
Primary	-	-	11	36.6	-	-	-	-	7.04
High school	1	3.33	8	26.6	-	-	-	-	df=3
Higher secondary & above	-	-	5	16.6	-	-	-	-	NS
4.Occupation									
Home maker	1	3.33	4	13.3	-	-	-	-	
Private employee	-	-	4	13.3	-	-	-	-	9.33
Government employee	-	-	4	13.3	-	-	-	-	df=4
Self employed	-	-	6	20	-	-	-	-	NS
Agriculture	-	-	11	36.6	-	-	-	-	

5.History of previous orthopedic surgery						-	-	-	28.9***
Yes	1	3 .33	1	3 6.6	-	-	-	-	df=1
No	-	-	18	60	-				
6.Types of analgesics used									
Oral	-	-	1	36. 6	-	-	-	-	29.5***
parenteral	1	3.33	18	60	-	-	-	-	df=1
7.Frequency of analgesics administration									
Once a day	-	-	9	30	-	-	-	-	32.01***
Twice a day	1	3.33	20	66.6	-	-	-	-	df=1
8.Types of orthopedic surgery									
Upper extremity	-	-	1 3	43 .3	-	-	-	-	27.8***
Lower extremity	1	3.33	16	53.3	-	-	-	-	df=1
9.Types of anesthesia									
Spinal	1	3.33	24	80	-	-	-	-	
General	-	-	3	10	-	-	-	-	38.8***
Regional	-	-	2	6.6	-	-	-	-	df=2

(NS-Not significant,*P<0.05 – significant, **P<0.01 & ***P<0.001- Highly significant)

The table 15 shows that there was no association between the level of quality of recovery and demographic variables such as educational status and occupation. Other demographic variables had association with their level of quality of recovery among patients undergone orthopaedic surgery in the control group. Hence research hypothesis H_7 is accepted.

T**able: 16**

Association between pre test level of quality of recovery among patients undergone orthopedic surgery in the experimental group with selected demographic variables.

n = 30

Demographic variables	**Poor**		**Average**		**Good**		**Better**		**X^2-value**
	F	**%**	**F**	**%**	**F**	**%**	**F**	**%**	
1.Age(in years):									
20-40	-	-	6	20	-	-	-	-	
40-60	-	-	11	36.6	-	-	-	-	10.7*
60-80	-	-	11	36.6	-	-	-	-	df=3
Above 80	-	-	2	6.6	-	-	-	-	
2.Gender:									
Male	-	-	13	43.3	-	-	-	-	30.5***
Female	-	-	17	56.6	-	-	-	-	df=1
3.Educational status:									
Illiterate	-	-	9	30	-	-	-	-	
Primary	-	-	5	16.6	-	-	-	-	14**
High school	-	-	9	30	-	-	-	-	df=3
Higher secondary & above	-	-	7	23.3	-	-	-	-	
4.Occupation									
Home maker	-	-	7	23.3	-	-	-	-	
Private employee	-	-	2	6.6	-	-	-	-	10*
Government employee	-	-	5	16.6	-	-	-	-	df=4
Self employed	-	-	6	20	-	-	-	-	
Agriculture	-	-	10	33.3	-	-	-	-	

5.History of previous orthopedic surgery									
Yes	-	-	13	43.3	-	-	-	-	31***
No	-	-	17	56.6	-	-	-	-	df=1
6.Types of analgesics used									
Oral	-	-	13	43.3	-	-	-	-	31***
Parenteral	-	-	17	56.6	-	-	-	-	df=1
7.Frequency of analgesics administration									
Once a day	-	-	6	20	-	-	-	-	41***
Twice a day	-	-	24	80	-	-	-	-	df=1
8.Types of ortho surgery									
Upper extremity	-	-	10	33.3	-	-	-	-	33.3***
Lower extremity	-	-	20	66.6	-	-	-	-	df=1
9.Types of anesthesia									
Spinal	-	-	23	76.6	-	-	-	-	
General	-	-	4	13.3	-	-	-	-	36.1***
Regional	-	-	3	10	-	-	-	-	df=2

(NS-Not significant, *P<0.05 – significant, **P<0.01 & ***P<0.001- Highly significant)

The table 16 shows that there was an association between all the demographic variables and their level of quality of recovery among patients undergone orthopaedic surgery in the experimental group. Hence research hypothesis H_7 is accepted.

CHAPTER – V

DISCUSSION

This study was conducted to assess the effectiveness of back massage in reducing post operative pain and improving quality of recovery among patients undergone orthopedic surgery in selected hospitals at Dindigul district.

A convenience sampling technique was used to collect data from the study participants. 60 samples were taken, 30 in experimental and 30 in control group. Pretest and post test was conducted. The Data were collected for a period of six weeks in city and JCB hospitals, at Dindigul district.

The discussion was based on the objectives specified in this study.

The first objective was to assess the pre and post test level of pain and quality of recovery among patients undergone orthopedic surgery in the control and experimental group.

Findings of pre test level of pain in control group on day I and Day-II shows that all 30subjects (100%) had severe level of pain and there was no change in the post test level of pain. The pre test level of pain on Day-III, 27(90%) subjects had severe level of pain and there was no change in the post test level of pain.

Whereas in experimental group, the pre test level of pain on first post operative day 22 subjects (73.3%) had severe level of pain and on third post operative day, 23 subjects (76.6%) had moderate level of pain and the post test level of pain on first post operative day 17 subjects (56.6%) had moderate level of pain, on third post operative day 19(63.3%) had

mild level of pain. These findings revealed that the back massage is highly effective in reducing post operative pain among patients undergone orthpaedic surgery.

Findings shown that the pre test level of quality of recovery in control group, 28 of them (93.3%) had average level of quality of recovery and in the post test, 29of them (96.6%) had average level of quality of recovery.

The pre test level of quality of recovery in experimental group, 30 of them (100%) had average level of quality of recovery and in the post test, 29of them (96.6%) had good level of quality of recovery. These findings concluded that the back massage is highly effective in improving quality of recovery among patients undergone orthpaedic surgery.

The above findings are consistent with the findings of Esther Moke and Chin Pang Woo (2004) conducted a study to assess the effects of slow back massage on shoulder pain and anxiety among patients undergone plate removal surgery. 102 patients were selected randomly and assigned to experimental and control group. The intervention consisted of 10 minutes back massage for 7 consecutive evenings among experimental group. Results showed that massage intervention significantly reduced the patient's level of pain perception and anxiety and improved their quality of recovery. It was an effective nursing intervention for reducing shoulder pain and anxiety in patients with plate removal.

The second objective was to evaluate the effectiveness of back massage on the level of pain and quality of recovery among patients undergone orthopedic surgery in experimental group.

The calculated 't' value on day-I,II,III in the experimental group were 43.5, 36.84, 33 was statistically highly significant at $p<0.001$ level which clearly shows that there was a significant reduction in the level of pain among patients undergone orthopedic surgery after

giving back massage. The mean post test level of pain will be significantly lower than the mean pre test level of pain among patients undergone orthopedic surgery in the experimental group. Hence H_1 is accepted.

The obtained‘t’ value on day-I, day-II, day-III for level of pain between the control and experimental group is 7.35, 14.64, 23.41 which were highly significant at $p<0.001$ level. These findings revealed that the subjects in experimental group had decreased level of pain after giving back massage compared to control group. The mean post test level of pain in experimental group will be significantly lower than the mean post test level of pain in control group among patients undergone orthopedic surgery. Hence research hypothesis H_2 is accepted.

The calculated ‘t’ value (21) for quality of recovery in experimental group was highly significant at $p<0.001$ level which clearly shows that there was a significant improvement in the level of quality of recovery among patients undergone orthopedic surgery after giving back massage. The mean post test level of quality of recovery will be significantly higher than the mean pre test level of quality of recovery among patients undergone orthopedic surgery in the experimental group. Hence H_3 is accepted.

Findings of obtained‘t’ value for level of quality of recovery between the control group and experimental is 19.66 which was significant at $p<0.001$ level. It shown that the subjects in experimental group had improved quality of recovery after giving back massage compared to control group. The mean post test level of quality of recovery in experimental group will be significantly higher than the mean post test level of quality of recovery in control group among patients undergone orthopedic surgery. Hence research hypothesis H_4 is accepted.

The above findings are consistent with the findings of **Eghbali M. Lellahgani H et al., (2010)** conducted a study to evaluate the effectiveness of back massage on pain severity in orthopedic surgical patients.60 arthroscopic knee surgical patients were selected and they were randomly divided into experimental and control group. In experimental group, patients were massaged by researcher along with bed side routine treatments for 5 weeks. Pain severity was evaluated before and after the massage therapy by using visual analog scale. Data analysis revealed a meaningful difference between mean score of pain severity before and after the massage in intervention group. The result showed that back massage is one of the effective treatments for reducing pain in orthopedic surgical patients.

The above findings are consistent with the findings of **Mary Walton et al., (2009)** conducted a study to find out the immediate effects of effleurage back massage on physiological and psychological relaxation of orthopedic surgical patients. 60 adult clients were selected by purposive sampling technique. They were divided into two groups of experimental and control. Data was obtained by using visual analog scale, Anxiety scale and Vital signs inventory scale and patients were turned to back massage who were in experimental group. Physiological and psychological parameters were assessed after 5^{th} and 30^{th} minutes of back massage. Data analysis revealed that comparison of physiological and psychological parameters before and after back massage. T value was 2.58 at 0.05 levels. Finally they concluded that massage was effective in all the physiological and psychological parameters and nurses could implement this intervention along with routine treatment.

The third objective was to correlate the level of pain with quality of recovery among patients undergone orthopedic surgery in the control and experimental group

Findings Shown that, there was a negative correlation (r= -0.420) between posttest level of pain and quality of recovery in experimental group at P<0.01 level. It was inferred that there is a significant improvement in quality of recovery as the pain intensity was reducing experimental group. There will be a significant correlation between level of pain and quality of recovery among patients undergone orthopedic surgery in the control and experimental group. Hence research hypothesis H_5 is accepted.

The above findings are consistent with the findings of Jing Wang et al., (2015) conducted a study on correlations between Health-Related Quality of recovery and Pain and Anxiety in Orthodontic Patients in the Initial Stage of Treatment.252 eligible participants were selected and data was obtained by validated Chinese versions of questionnaires, including the State-Trait Anxiety Inventory (S-AI), the visual analogue scale (VAS), and the Short-Form 36-Item Health Survey (SF-36) at baseline and on days 1, 2, 3, 7, 14, and 30 after initial arch wire placement (SF-36 only at baseline and day 30). Significant changes were observed in physical function ($P < 0.01$), body pain ($P = 0.01$), and general health ($P < 0.01$) domains. Spearman correlation coefficients for SF-36 with S-AI were −0.131∼−0.515 ($P < 0.05$); SF-36 with VAS were −0.141∼−0.273 ($P < 0.05$), indicating significant but moderate negative correlations between quality of recovery and pain/anxiety.

The fourth objective was to find out the association between level of pain among patients undergone orthopedic surgery and their selected demographic variables

There was no association between the level of pain and their demographic variable of occupation. There was a significant association between the levels of pain and the other

demographic variables among patients undergone orthopedic surgery in the control group. Hence research hypothesis H_6 is accepted.

There was a significant association between the demographic variables such as age, gender, history of previous surgery, types of analgesics used and types of anesthesia and their level of pain. No other demographic variables were shown any association with their level of pain among patients undergone orthopedic surgery in the experimental group. Hence research hypothesis H_6 is partially accepted.

The above findings are consistent with the findings of **Candace H Feldman et al., (2014)** conducted a study on association between socioeconomic status and pain among total knee arthroplasty clients. 316 patients were selected and the collected data shows that the mean age was 65.9 (SD 8.7), 59% were female, and 88% were Caucasian; 17% achieved less than college education and 62% were college graduates. The median area socioeconomic status index score was 59 (U.S. median 51). Analysis demonstrated statistically significant associations between higher individual- and area-level socioeconomic status and better function and less pain. They were concluded in this cohort, Patients with higher socioeconomic status (SES) are shown to have better total knee arthroplasty (TKA) outcomes compared to those with lower socioeconomic status.

The fifth objective was to find out the association between level of quality of recovery among patients undergone orthopedic surgery and their selected demographic variables

There was no association between the level of quality of recovery and demographic variables such as educational status and occupation. Other demographic variables had shown association with their level of quality of recovery among patients undergone orthopaedic surgery in the control group.

Whereas in the experimental group, there was an association between all the demographic variables namely age, gender, educational status, occupation, history of previous surgery, types of analgesics used, frequency of analgesics administration, types of ortho surgery, types of anesthesia and their level of quality of recovery among patients undergone orthopaedic surgery. Hence research hypothesis $H_{7\ is}$ accepted in both control and experimental group.

The above findings consistent with the findings of **Maren F Lindberg MSc, RN et al., (2013)** conducted a cross sectional survey on Pain characteristics and self-rated health after elective orthopaedic surgery. 123 elective orthopaedic inpatients recruited consecutively and Patients were divided into three diagnostic groups: shoulder surgery, hip or knee replacement and other surgery. Patients have completed items about pain intensity. The results showed that Mean age was 60 years (SD 17·2) and 50% were females. Average pain intensity was 4·2 (SD 2·2) on a 0–10 numeric rating scale and 60% reported moderate/severe pain during the entire hospital stay. Shoulder surgery patients reported significantly higher pain intensity compared to other surgical groups. Pain interfered mostly with daily activity and sleep. Quality of recovery was significantly associated with occupation and administration of analgesics. They concluded that High pain intensity is related to poorer self-rated health.

CHAPTER-VI

SUMMARY AND RECOMMENDATIONS

This chapter gives brief account of the present study along with the conclusion drawn from the findings, recommendation, implication, conclusion, suggestions for further studies and nursing implications.

SUMMARY OF THE STUDY

The focus of the present study was to assess the effectiveness of back massage in reducing post operative pain and improving quality of recovery among patients undergone orthopedic surgery at selected hospitals in Dindigul district.

Objectives of the study

1. To assess the pre and post test level of pain and quality of recovery among patients undergone orthopedic surgery in the control and experimental group

2. To evaluate the effectiveness of back massage on the level of pain and quality of recovery among patients undergone orthopedic surgery in experimental group.

3. To correlate the level of pain with quality of recovery among patients undergone orthopedic surgery in the control and experimental group

4. To find out the association between level of pain among patients undergone orthopedic surgery and their selected demographic variables in the control and experimental group.

5. To find out the association between level of quality of recovery among patients undergone orthopedic surgery and their selected demographic variables in the control and experimental group.

HYPOTHESIS

H_1-The mean post test level of pain will be significantly lower than the pre test level of pain among patients undergone orthopedic surgery in the experimental group

H_2-The mean post test level of pain in experimental group will be significantly lower than the mean post test level of pain in control group among patients undergone orthopedic surgery.

H_3- The mean post test level of quality of recovery will be significantly higher than the pre test level of quality of recovery among patients undergone orthopedic surgery in the experimental group

H_4-The mean post test level of quality of recovery in experimental group will be significantly higher than the mean post test level of quality of recovery in control group among patients undergone orthopedic surgery.

H_5- There will be a significant correlation between level of pain and quality of recovery among patients undergone orthopedic surgery in the control and experimental group.

H_6-There will be a significant association between the level of pain among patients undergone orthopedic surgery and their demographic variables in the control and experimental group.

H_7-There will be a significant association between the level of quality of recovery among patients undergone orthopedic surgery and their demographic variables in the control and experimental group.

The design of the study was quasi experimental, non randomized control group pre test –post test design. The conceptual frame work was based on gate control theory of pain. The gate control theory was first postulated by Ronald Melzack and Patrick David Wall

in 1965. This theory suggests that for pain to pass through the gate there must be unopposed passage for nociceptive information arriving at the synapses in the substantia gelatinosa. The pain impulses will be carried out by the small diameters and it will open the pain gate and the person feels pain. Many non-pharmacological procedures such as back massage (application of pressure), TENS stimulate the nerve endings connected with large diameter fibers which can produce a reduction of pain by closing the pain gate.

The sample size of the study was 60 patients who have undergone orthopedic surgery and were in 1-3rd post operative days in selected hospitals at Dindigul district. The experimental and control group consisted of 30 subjects in each. Convenience sampling technique was adopted for the selection of sample. Demographic data of the subjects were collected.

The investigator collected pre test data using visual analog scale and Modified post operative recovery scale for both group. Experimental group received intervention of back massage for 15-20 minutes twice a day with daily routine care for 1-3 post operative days before giving analgesics. Control group received routine care without intervention. Post test was conducted by the investigator for both groups. For experimental group, post test was conducted 1 hour after administration of back massage. The data were analyzed using both descriptive and inferential statistics.

MAJOR FINDING OF THE STUDY

With regard to age, 11 (36.6%) in experimental group and 12(40%) in control group belongs to the age group of 40 to 60 years and 2 (6.6%) in experimental group and 3(10%) in control group belonged to the age group of above 80 years.

Considering the sex, 17 (56.6%) subjects in the experimental group and 14 (46.6%) in the control group were females and the remaining were males.

In relation to education, 9(30%) of them had high school education and 5(16.6%) of them had primary education in experimental group and 9(30%) of them had high school education and 11(36.6%) of them had primary education in control group.

With regard to the occupation, 10(33.3%) were agriculture workers and 2(6.6%) were private employees in experimental group and 8(26.6%) were agriculture workers and 4(13.3%) were private employees in the control group.

Regarding the history of previous orthopedic surgery, 17(56.6%) in experimental group and 18(60%) in control group had no history of previous orthopedic surgery.

Considering the types of analgesics used, 17(56.6%) subjects in experimental group and 19(63.3%) in control group had parenteral type of analgesics used.

In relation to frequency of analgesics administration, 24(80%) of them in the experimental group and 21(70%) of them in the control group got analgesics twice a day.

With respect to types of orthopedic surgery, 20(66.6%) of subjects in experimental group and 17(56.6%) in the control group had lower extremity orthopedic surgery.

With regard to the types of anesthesia, 23(76.6%) subjects in the experimental group and 25(83.3%) of subjects in the control group undergone spinal anesthesia and 3(10%) subjects in the experimental group and 2(6.6%) subjects in the control group undergone regional anesthesia.

Findings of pre test level of pain in control group on day I and Day-II shows that all 30subjects (100%) had severe level of pain and there was no change in the post test level of

pain. The pre test level of pain on Day-III, 27(90%) subjects had severe level of pain and there was no change in the post test level of pain.

Whereas in experimental group, the pre test level of pain on first post operative day 22 subjects (73.3%) had severe level of pain and on third post operative day, 23 subjects (76.6%) had moderate level of pain and the post test level of pain on first post operative day 17 subjects (56.6%) had moderate level of pain, on third post operative day 19(63.3%) had mild level of pain.

Findings shown that the pre test level of quality of recovery in control group, 28 of them (93.3%) had average level of quality of recovery and in the post test, 29of them (96.6%) had average level of quality of recovery.

The pre test level of quality of recovery in experimental group, 30 of them (100%) had average level of quality of recovery and in the post test, 29of them (96.6%) had good level of quality of recovery.

The calculated‘t’ values on day-I,II,III in the control groupwere1.50, 1.00, 1.00 which are not significant.It is concluded that there was no significant differences between the pre and post test level of pain among patients undergone orthopaedic surgery.

The calculated ’t’ value on day-I,II,III in the experimental group were 43.5, 36.84, 33 was statistically highly significant at $p<0.001$ level which clearly shows that there was a significant reduction in the level of pain among patients undergone orthopedic surgery after giving back massage.Hence H_1 is accepted.

The obtained‘t’ values on day-I, day-II, day-III for level of pain between the control and experimental group is 7.35, 14.64, 23.41 which were highly significant at $p<0.001$ level. These findings revealed that the subjects in experimental group had decreased level of pain after giving back massage compared to control group. Hence research hypothesis H_2 is accepted.

The calculated‘t’ value of 1.50 was non-significant which clearly shows that there was no differences between the pre and post test level of quality of recovery among patients undergone orthopedic surgery in the control group.

Whereas the calculated ‘t’ value (21) for quality of recovery in experimental group was highly significant at $p<0.001$ level which clearly shows that there was a significant improvement in the level of quality of recovery among patients undergone orthopedic surgery after giving back massage. Hence H_3 is accepted.

The obtained ‘t’ value for level of quality of recovery between the experimental and control group was 19.66 which was highly significant at $p<0.001$ level and based on mean difference, the physical independence score was 13.33 which has greater improvement than other parameters. It is concluded that the back massage was highly effective in improving quality of recovery. Hence H_4 is accepted.

There was a negative correlation ($r= -0.420$) between posttest level of pain and quality of recovery in experimental group at $P<0.01$ level. It is inferred that there was a significant improvement in quality of recovery as the pain intensity was reduced in experimental group. Hence research hypothesis H_5 is accepted.

There was no association between the level of pain and their demographic variable of occupation. There was a significant association between the level of pain and the other demographic variables among patients undergone orthopedic surgery in the control group. Hence H_6 is accepted.

There was a significant association between the demographic variables such as age, gender, history of previous surgery, types of analgesics used and types of anesthesia and their level of pain. No other demographic variables were shown any association with their level of

pain among patients undergone orthopedic surgery in the experimental group. Hence H_6 is partially accepted.

There was no association between the level of quality of recovery and demographic variables such as educational status and occupation. Other demographic variables had association with their level of quality of recovery among patients undergone orthopaedic surgery in the control group.

Whereas in the experimental group, there was an association between all the demographic variables namely age, gender, educational status, occupation, history of previous surgery, types of analgesics used, frequency of analgesics administration, types of ortho surgery, types of anesthesia and their level of quality of recovery among patients undergone orthopaedic surgery. Hence research hypothesis H_7 is accepted in both control and experimental group.

CONCLUSION

The main conclusion of this present study was the back massage is effectively reducing the post operative pain and improving quality of recovery among patients undergone orthopedic surgery. This study clearly stated that back massage plays a vital role in reducing the level of post operative pain and improving quality of recovery among patients undergone orthopedic surgery.

IMPLICATIONS

The findings of the study have several implications in following field. It can be discussed in four areas namely nursing practice, Nursing administration, Nursing education and Nursing research.

Nursing practice

- Complimentary therapies can provide effective economical, non-invasive, non-pharmacological complements to medical care.
- Back massage is one of touch therapy, which in this study has proved effective in reducing post operative pain and improving quality of recovery among patients undergone orthopedic surgery.
- Nurses can adopt simple interventions like back massage while providing care for the post operative orthopedic patients.
- Back massage used in this study can be applied in the practice set up; there by increasing the nursing practice based on evidence.

Nursing administration

- Nurse administrators can arrange seminars and workshops to educate learners and staff nurses regarding pain management of patients undergone orthopedic surgery.
- The findings of this study will help nurse administrator to plan and organize various in service programmes like in-service education and workshop on back massage and its effects on post operative orthopedic patients.
- It helps to provide critical thinking regarding pain management in orthopedic surgical unit.
- The nurse administrator can take part in developing protocols related to back massage.

Nursing education

- Several implications can be drawn from the present study for nursing education
- The curriculum incorporating the recent trends and demands of the changing society needed for the progress of nursing education.

- Practical hours for complementary and alternative medicine including yoga, massage and reflexology can be included in the nursing curriculum which will help the students to improve their skills.

Nursing research

- This study motivates nursing personnel to do further studies related to this field.
- Research can be conducted to find out the effectiveness of various non-pharmacological methods in pain management of patients who have undergone orthopedic surgery.

LIMITATIONS

- Intervention was limited to 15 – 20 minutes
- Study was conducted only on patients who have undergone upper and lower extremity orthopedic surgery
- Relatively small sample size
- Randomization of samples could not be done

RECOMMENDATIONS

- The study can be replicated on a larger samples to generalize the results
- The comparative study can be conducted with more than one intervention
- Training programmers for nurses can be given on complimentary therapies
- A study can be conducted to evaluate the knowledge and attitude of nurses regarding back massage in reducing pain among patients undergone orthopedic surgery.

BIBLIOGRAPHY

BOOK REFERENCES

1. Akyol Ö, Karayurt Ö & Salmond S. (2009) ‘’ **Text book of Orthopaedic Nursing**’’ 2nd edition, India, p-28-79.

2. Black MJ (2005),’’ **Text book of Medical Surgical Nursing; clinical management for positive outcomes**’’ 7th edition, Elsevier publication, New Delhi.

3. Eisenberg, D.M., Davis, R.B., Ettner, S.L., et al.,(1998)'' **Trends in alternative medicine use in the United States**'', 1990–1997: results of a follow-up national survey. P-280, 1569–1575
4. Gurumani.N. (2005),**"An Introduction To Biostatistics"** 2nd edition, MJP Publication, New Delhi, p- 211-213,347-369.
5. Kumar.P (2005) '' **A text book of pain** '', 1st edition, Modern publishers, New delhi.
6. Lewis et al., (2010)'' **Text book of medical surgical nursing**'', 7th edition, Mosby Missouri, p-1204-1216.
7. MacLellan, K. (2006),**"Management of pain**'', United Kingdom, London: Nelson
8. Manfred stommel and celia E.Wills (2004)'' **Clinical research**'', 1st edition, USA, Lippincott Williams and wilkins, p-243-250.
9. Prabhakara GN (2006),'' **Bio-statistics**'' 1st edition, Jaypee Brothers Medical Publishers (P) Ltd, p- 39-53.
10. Potter A.Patricia and Perry G Anne (1991),**"Basic Nursing Theory and Practice"**, 2nd edition, Mosby publication, New delhi.
11. Polit F.Denise and Cheryl Tatano Beck (2010)**"Nursing Research"**, 7th edition, WoltersKluwes India pvt Ltd, New delhi, p- 507-583.
12. Vicker A & Zollman C. (1999) **''ABC of complemantary medicine: Massage therapies"** BMJ 319, p- 12-54-1257.
13. Wang HL, Keck JF (2004),'' **A text book of massage to decrease pain among post operative patients; Pain Management Nursing"**, p- 12-14.

14. Warren Stomberg M & Öman UB. (2006)**"Patients undergoing total hip arthroplasty: A perioperative pain experience"**, p- 451-458

JOURNAL REFERENCES

1. Akyol Ö, Karayurt Ö & Salmond S. (2009)'' Experiences of pain and satisfaction with pain management in patients undergoing total knee replacement; Orthopaedic Nursing'' 28(2): 79-85.
2. Allred KD, Byers JF & Sole ML. (2010) '' The effect of music on postoperative pain and anxiety; Pain Management Nursing'' 11(1): 15-25.
3. Buyukyilmaz F & Asti T (2013)'' The effect of relaxation techniques and back massage on pain and anxiety in Turkish total hip or knee arthroplasty patients. Pain Management Nursing''14(3): 143-154
4. Chin, C. C. (1999)'' The effects of back massage on surgical stress responses and postoperative pain''Cleveland,OH: Doctoral thesis, Frances Payne Bolton School of Nursing,Case Western Reserve University
5. Esen Büyükyılmaz F & Aştı T. (2010)'' Postoperative pain characteristics in Turkish orthopaedic patients. Pain Management Nursing'' 11(2): 76-84
6. Funda Büyükyılmaz, BSN, PhD Non- Pharmacological Intervention in Orthopedic Pain: A Systematic Review, International Journal of Caring Sciences September-December 2014 Volume 7 Issue 3
7. Gregory, J. (2005)''Pain management and orthopaedic care''In J.D. Kneale, P.S. Davis, & A. Powell (Eds.), Orthopaedic and trauma nursing (2nd ed., pp. 140–164)
8. Hill, N., & Davis, P. (2000)''Nursing care of total joint replacement, Journal of Orthopaedic Nursing'', 4, 41–45.

9. Holland B & Pokorny ME. (2001)'' Slow stroke back massage: Its effect on patients in a rehabilitation setting. Rehabilitation Nursing''26(5): 182-18
10. Labyak SE, Metzer BL (1997)'' The effects of effleurage back rub on the physiological components of relaxation: A meta-analysis'', Research 46(1): 59
11. Pasero C &McCaffery M. (2007)'' Orthopaedic postoperative pain management. Journal of Peri Anesthesia Nursing '' 22(3): 160-174
12. Pellino, T. A., Gordon, D. B., Engelke, Z. K., Burse, K. L.,Collins, M. A., Silver, C. E., & Norcross, N. J. (2005)'' Use of non-pharmacologic interventions for pain and anxiety after total hip and total knee arthroplasty. Orthopedic Nursing'',24 (3), 182–190.
13. Tom W, Shaver K'', Safe use of acetaminophen (Tylenol)'',*Pharmacist's* Letter/Prescriber's Letter. 2006; 22:220714

NET REFERENCES

1. www.clinicalpharmacology.com.
2. www.medscape.com/viewarticle/706160_2
3. www.fundabuyukyilmaz.com
4. www.ncbi.nlm.nih.gov/pmc/articles/PMC3528189
5. www.clinicalpharmacology.com.
6. www.patients onlinelibrary.wiley.com/…0.1111/j.1526-4637.2010...

7. www.ncbi.nlm.nih.gov/pubmed/21388906

8. www.mendeley.com

9. www.internationaljournalofcaringsciences.org

10. www.massage therapy/pubmed.com

11. http://www.biomedcentral.com/1472-6955/7/10

12. http://dx.doi.org/10.1016/j.ctnm.2004.05.006